



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



The Asclepiad

Benjamin Ward Richardson

REICHARDT'S UNITED STATES

St. Houston Tex.

A 1.F.1884.2

Harvard University
Library of
The Medical School
and
The School of Public Health



The Gift of the
New Hampshire State
Library.

N.H. STATE
LIBRARY

3742 113
V7A98U

610.5
A814
1888

THE ASCLEPIAD.

A Book of Original Research and Observation

IN THE

SCIENCE, ART, AND LITERATURE OF MEDICINE,
PREVENTIVE AND CURATIVE.

1888.

BY

Benjamin Ward Richardson, M.D., F.R.S.

VOLUME V.

TERAR DUM PROSIM.

London :

LONGMANS, GREEN, AND COMPANY,
PATERNOSTER ROW.

P. BLAKISTON, SON, & CO., PHILADELPHIA, U.S.A.

CUPPLES, UPHAM, & CO., BOSTON, U.S.A.

LIBRARY
20 FEB 1948
1.F.1884.2

THE
YAGU

Digitized by Google

To

JOHN MCINTYRE, M.D., LL.D.,

OF ODIHAM, HANTS.

MY DEAR MCINTYRE,—

I might well dedicate this the fifth volume of my ASCLEPIAD to you, in grateful recognition of the munificent gift which you have made, during the past year, to the medical aspirants to fame of the Glasgow School of Medicine, where in days "lang syne" you and I pursued our youthful studies. But I do it on still other grounds: on the remembrance of our almost lifelong friendship; of the many happy hours we have spent together in discussion of subjects of mutual interest; and in sincere acknowledgment of the support I have derived from your sympathetic recognition of my labours and their intention. In the acknowledgment of all which permit me to remain,

Your affectionate and obliged,

BENJAMIN WARD RICHARDSON.

LONDON, November 15th, 1888.

31472.104
Y9A9811

PREFACE

TO THE FIFTH VOLUME OF THE "ASCLEPIAD."

THE present volume of the ASCLEPIAD differs from previous volumes in that one subject, *The Art of Embalming*, has been extended through the four parts. This was necessary in order to present completely a series of details which could not be compressed, with the utmost attempt at compression, into one article; and, as the change has been very acceptable to my readers, I shall follow it up, in whole or in part, from this time forward.

THE AUTHOR.

25, MANCHESTER SQUARE, LONDON, W.

November 15th, 1888.

ERRATA.

THE FOLLOWING CORRECTIONS ARE REQUIRED IN "ASCLEPIAD," VOL. V. :—

At page 24, line 6, for "*non est mora*," read "*non est mora longa*."

At page 62, line 11, after the word "*Cane*," add the words "*Dr. MacMichael*."

At page 68, line 18, after the word "*Hippocrates*," add the words "*De Morbis Popularibus*."

At page 160, line 3 from the bottom, for "*calloosum*" read "*callosum*."

At page 211, line 11 from the bottom, for "*pungents*" read "*pungent*."

At page 232, line 6, for "*main a few ays*," read "*remain a few days*."

At page 238, line 6, for "*eb*" read "*et*."

At page 253, line 15, for "*breath*" read "*breast*," and in the same line for the words "*to examine*" read "*I examine*."

CONTENTS.

VOLUME V.

	PAGE
ON PULMONARY OR PNEUMO-PARESIS	1
THE ART OF EMBALMING. PART I. THE ANCIENT METHOD	23
OPUSCULA PRACTICA	40, 135, 229, 326
MEAD, RICHARD, M.D., F.R.S. (<i>with Portrait</i>)	49
A HISTORY OF SOME RESEARCHES IN THERAPEUTICS	80, 174, 269, 370
COTEMPORARY PRACTICE AND LITERATURE	91, 184, 288, 382
ALCOHOL AT THE BEDSIDE. A CLINICAL STUDY	101
THE ART OF EMBALMING. PART II. THE METHOD BY INJECTION	121
MORGAGNI, JOHN BAPTIST, M.D., F.R.S., AND THE BIRTH OF PATHOLOGY (<i>with Portrait</i>)	147
ATROPA MANDRAGORA. A HISTORY OF SOME RESEARCHES IN THERAPEUTICS	174
METHYLENE AS AN ANÆSTHETIC	201
THE ART OF EMBALMING. PART III. THE LATEST METHODS	212
LAENNEC, RENÉ THEOPHILE HYACINTHE, M.D., AND THE DISCOVERY OF MEDIATE AUSCULTATION BY THE STETHOSCOPE (<i>with Portrait</i>)	241
OBSERVATIONS IN PHYSIOLOGICAL THERAPEUTICS MADE ON THE FRESH - WATER JELLY - FISH, OR MEDUSA (<i>LIMNOCODIUM</i> <i>SOWERBII</i>). A HISTORY OF SOME ORIGINAL RESEARCHES IN THERAPEUTICS	269
PRACTICAL NOTES ON THE MORPHINE HABIT.	301
THE ART OF EMBALMING. PART IV. EMBALMING WITH A POST-MORTEM EXAMINATION	316
HUNTER, WILLIAM, M.D., F.R.S., F.S.A. (<i>with Portrait</i>)	339
EXPERIMENTS WITH HYDROGEN ON VITAL ACTION. A HISTORY OF SOME ORIGINAL RESEARCHES IN THERAPEUTICS	370

ILLUSTRATIONS.

VOLUME V.

	PAGE
MEAD, RICHARD, M.D., F.R.S. <i>Portrait facing</i>	49
MEAD, RICHARD, SKETCH OF, BY HOGARTH <i>Plate facing</i>	62
TEST TUBE FOR AMMONIA	40
BLOOD UNDER AMMONIA	42-3
MORGAGNI, JOHN BAPTIST, M.D. <i>Portrait facing</i>	147
RUBBER TUBE OF ALLEN'S SURGICAL PUMP FOR EMBALMING . . .	227
THE ASPIRATOR	227
EMBALMING TROCAR	228
LAENNEC, RENÉ THEOPHILE HYACINTHE, M.D. . . <i>Portrait facing</i>	241
ILLUSTRATION OF FRESH-WATER JELLY-FISH, OR MEDUSA . . .	273
HUNTER, WILLIAM, M.D., F.R.S., F.S.A. . . . <i>Portrait facing</i>	339
DIAGRAM OF DR. CHARLES THOMAS HADEN'S ORIGINAL STETHOSCOPE	383



ON PULMONARY OR PNEUMO-PARESIS.*

THE subject on which I have the honour to speak before the Society this evening is perhaps one of the oldest in medicine, for the phenomena to be referred to must have been observed ever since the sick were submitted to medical observation.

If I put the subject, therefore, before the Society under a new name and in a new form, it is simply for the purpose of trying to bring the new light of modern science to bear upon it, and of asking for the experience and wisdom of the Fellows to assist in solving various doubts and difficulties which seem to me to surround an important and always anxious, though happily rare, form of acute pulmonary disease.

And, as this Society is above all things clinical in its object and insight, I shall proceed at once to describe the meaning I attach to the term *pulmonary paresis* or *pneumo-paresis*, by reciting, from nature, some clinical phenomena derived from two or three typical examples of the disease.

* Paper read before the Medical Society of London, on Monday, December 12th, 1887.

EXAMPLE I.

A young lady, twenty-three years of age, had enjoyed moderately good health from her childhood. She was of unfavourable position in regard to her family history. Her father had died of phthisis pulmonalis; an uncle was troubled with what may be called asthma; her mother was delicate, and had exhibited signs of strumous neck in early life; and a sister, who was affected with slight spinal curvature, was many years after the events I am about to relate under my care for bronchial asthma.

I dwell on these facts because they have, I think, a very important bearing on the case before us.

In her usual health, the young lady, who was very active and of happy disposition, went to a country picnic, where, from sitting upon the grass, she contracted what she considered was a chill. It was very slight, and if she had not connected it with the fact that on the day following she became prematurely unwell, she would not have paid any attention to it. The menstrual period this time was short, and the amount of discharge scanty, and as it ceased she became, for the first time in her life, hysterical. There was nothing to account for the hysteria, and it would have been thought of no moment but that it was attended by a short, sharp cough which caused some alarm, and after some days of continuance led the friends to consult their old family adviser, the late Mr. E. D. Hudson, under whose care and my own the patient came.

The whole of the symptoms led us in the first instance to consider that we had merely to deal with hysteria. There was no febrile disturbance, there was no indication whatever of pulmonary lesion, neither was there any pain, difficulty of breathing, or expectora-

tion. The bowels were constipated, a usual condition with her, but the tongue was not loaded, and the only peculiarity in regard to the digestive process was a capricious appetite and distaste for almost every ordinary kind of food. The pulse was quick, running up in the evening to a hundred in the minute, and there was a hectic flush at these times, but the heart-sounds were clear. The urine was copious and pale, but otherwise natural.

The diagnosis was "hysteria." The treatment was an aperient, followed by a valerian and ammonia mixture, with careful regulation in regard to diet and regimen.

Two days later we were summoned to the patient, who had become worse, and who felt unable to leave her bed. She was not particularly different from what we had before found her, but she exhibited a peculiar listlessness and languor which was quite unlike herself and which created a bad impression and foreboding on the part of her relatives,—to us a singular experience. She slept indifferently, woke constantly from cough, and coughed a sharp, dry bark frequently. A striking feature in the case now was the frequent recurrence of that cutaneous suffusion called by the older writers erythema fugax. The face and neck would become suffused with a bright red blush like a true erythema of the skin, but if the suffused part were pressed even slightly, it became blanched so sharply that I could, with the finger, trace a figure like the letter V or X upon it, the mark of which would remain in shape for a second or more. The pulse was now permanently quickened to a hundred and five a minute, but the tongue was moist and clean, the skin was moist, and there was no febrile heat. The respiratory murmur was perfectly clear in every part,

and there was no sign of bronchial *coo* or *râle*. We prescribed Dover's powder at bedtime, with a saline containing small doses of digitalis, and we held still to the view that the case was one of hysteria and that the prognosis was favourable.

For two days the symptoms remained unchanged, except that the hysteria was, if anything, intensified. The pupils were dilated, there was occasional slight delirium, with disposition to sing or laugh, but this was of short duration; the most common mental state was that of listlessness and, as it was said by the friends, "resignation."

On the seventh day after the development of the nervous prostration the cough became more severe, with some slight complaint of pain or dragging at the level of the base of the right lung, and at this spot I for the first time detected fine, dry crepitation. In a few hours the dry crepitation in the right lung became moist, and now in the left lung dry crepitation was heard at the base also posteriorly. There was still no acute fever, but the breathing became embarrassed. The cough continued, still dry and without any free or coloured expectoration; the listlessness passed rapidly into the exhaustion of collapse, and the muscles became restless. Finally, in spite of every treatment, the pneumonic mischief, or, as I would call it, the *acute pulmonary paresis*, progressed, and death took place in a few hours from pure asphyxia, the body becoming dark and cold before death, from the arrested oxidation.

For some time previous to death the complete dulness on percussion over the whole of the chest, the fine bronchial rales, and the diminished respiratory murmur, indicated the complete congestion of

the pulmonary vascular system in each lung, rising steadily from the base upwards.

EXAMPLE II.

The second illustration, in its final symptoms, resembled the last, but the commencement was of different character. I was summoned to Halifax to meet Mr. Bramley in consultation in the case of a lady who had recently been confined prematurely.

The patient in this instance was of emotional type. Her father had died in comparatively early life of phthisis, and his mother and sister had died of the same disease. Her own mother, though generally in good health, was of feeble circulation, and presented at times, in a most marked degree, that blanched condition of the fingers to which I have given the name of local syncope. She herself had been, up to the time I am speaking of, in fair health, but always delicate.

On December 21st this lady, being then within two months of her expected confinement, slipped while walking out of doors, and sustained a blow, from the fall, in the middle of the back. She also felt considerably shaken, and soon afterwards suffered from cough with which she was at times affected, but not so severely as to give cause for alarm. She rested for a day or two, and on December 25th (Christmas Day) had so far recovered that she went to church, and continued to move about until the 31st, on which day she was suddenly seized with faintness and indescribable exhaustion, from which she recovered on going to bed, and next day got up. On January 2nd she complained of indigestion, exhaustion, and cough, and Mr. Bramley was now sent for. He detected crepitation in the bases

of both lungs, and was particularly struck with the erythematous blush on the face and neck. It passed, he expressed to me, from redness to darkness and then to pallor like a changing scene, and he considered the whole of the symptoms as singularly anomalous, and anxious.

Some hours afterwards labour pains came on, upon which all the chest symptoms entirely ceased. Mr. Bramley was quite certain that even the crepitation had cleared off. The labour was slow but natural, and a seven-months child was born dead.

Within an hour after the labour was over the chest symptoms returned in the most active form, and my valued friend Dr. Clifford Allbutt was summoned. His prognosis, formed with his usual clearness of forecast, was unfavourable, and soon afterwards I was sent for. On my arrival I found precisely the same symptoms as were detailed in the last case. The patient had not the slightest expectation of recovery, and yet, just as in the previous instance, she had no fear or distress in regard to her fate. She had a disregard or distaste for food, though she refused neither food nor drink; and, except that she referred to the spot on the back where she conceived she had been injured by the fall, she had no pain. Her face was flushed, and her breathing slightly accelerated, but there was no acute febrile reaction. Her tongue was moist, and her bowels and all the other excretions were natural.

I found, in fact, a form of disease so precisely alike in symptoms to the symptoms described in the case already narrated that, except for the history of the fall, the injury to the back, and the parturition, one patient might have taken the place of the other. The occasional

erythema was the same; the expression of countenance and the diagnosis from the mind were precisely the same.

The physical examination, made with the utmost leisure and care, yielded no evidence of lesion anywhere except in the lungs. In the right lung there was dulness at the base throughout, and minute fine crepitation. In the left lung the area of dulness was much more limited than in the right at this time. The breathing, though quickened—twenty-four to twenty-eight in the minute—was without effort; and the cough was short and sharp, but there was no appearance of red tinge in the expectoration. The pulse was one hundred and fifteen in the minute at its highest, but it was irregular in regard to time, being down to ninety-five one hour and up to one hundred and fifteen another; it did not intermit, and it was not tense. The heart-sounds were perfectly clear, and there was no indication whatever of obstruction in any of its cavities. The temperature of the body was 99° Fahr.

The most careful examination of the spine failed to detect any injury there. There was no modification of movement, no swelling, no tenderness either on percussion or pressure.

At the request of Mr. Bramley and of the friends of this patient, I remained in attendance for many hours, and watched continuously the course of the symptoms until the end. The description of their course may be given in the fewest words. The exudation in the pulmonary organs continued steadily to increase hour by hour, until at last the most complete asphyxia caused the cessation of life. Not the lips and cheeks alone, but the whole body, assumed, with universal coldness, the cyanotic hue. The mind remained clear

until the coma of asphyxia supervened. There was no active convulsion, for the extinction of breathing was too slowly produced to allow the demonstration of strong muscular movement. The muscular excitability and the nervous stimulus died together in slow and regular progression.

EXAMPLE III.

The third illustration of the condition now under consideration is extremely typical. The patient, under the able care of my old and much-esteemed friend Mr. Lord, of Hampstead, who called me in for consultation, was again a lady, but more advanced in life than the two previous patients whose histories have been given above. She was forty-eight years of age, had passed the grand climacteric, and had been considered healthy, but rather delicate at times, and susceptible to cold. Her constitutional diathesis was not very clearly defined. She had forgotten many facts, and was too ill to be pressed for information; but I learned that chest affections had been present in her family, and that one of her parents had died of pneumonia. She herself in early life had suffered from what was called spinal irritation, and she had often felt weakness in the back, with dull pain. There was some slight lateral curvature, but at the time of the present illness there was no indication whatever of spinal mischief. Her symptoms had followed upon some little mental worry, anxiety, or grief, quite of minor importance, and from the first assumed the character of prostration of the physical powers, with mental composure, and with resignation to death. I do not remember ever giving professional service in all my life to any patient whose mind was so clear, serene, and open. She

took quite an intelligent interest in her own symptoms, and, ever grateful for all we were doing for her, did everything she could to allay the anxieties of those around her. At times there was a little of the emotional or hysterical element in her condition, but this was much more subdued than in the previous cases, the effect, no doubt, of more advanced years. When the early symptoms of failure of physical power appeared, they were unattended by any sign of localized organic disease; but after a few hours there was a slight paroxysm of quick breathing, with flushing of the face and some cough, symptoms which were relieved by rising from the recumbent into the sitting position. The first of these attacks came on in bed, not during sleep, but whilst reading, preparatory for going to sleep. From this time the cough became frequent, a short, dry cough, with very little expectoration, and not until much later on tinged or rusty. There were no febrile symptoms. The temperature, in fact, during the whole period of her illness, never rose above 99° Fahr., neither did it, until the last stage, fall below the natural.

The occurrence of the cough led to the physical examination of the chest by Mr. Lord, and he, being in doubt about the state of the base of the right lung, called me in. I found a line of dulness over the base of the right lung, with, in deep inspiration, fine, moist crepitation, but it was only on very deep inspiration that the crepitation was detectable, and it was very limited in its extent. It seemed to be, if I may so express it, in patches, which the mouth of the stethoscope covered. The circulation was quite natural, except that the pulse was rather quick—from eighty-five to ninety in the minute—and that there was, as in the previous examples, fugitive erythema

over the face and neck, more subdued than in the other patients, but well marked, especially after the taking of food or of warm drinks. The digestive functions were little, if at all, disturbed; the tongue was moist and clean, and the bowels acted regularly. The only sign of stomachic disturbance was an occasional flatulency, with globus, but always as a mere passing sign, relieved at once by drinking a little warm fluid. The urine was natural.

Guided by previous experience, my diagnosis in this case was clear and decisive, and I prognosticated from all the symptoms that the result would be a continuance of the exudation and a progressive failure of the pulmonary circulation, ending ultimately in death by asphyxia.

I regret to say that the prognosis proved only too correct. At my suggestion, we had the careful and most able assistance of our friend Dr. Handfield Jones. We carried out, I confidently believe, every reasonable line of treatment that could be devised, and the most vigilant watching by night and by day was sustained. It was of no avail. At each visit the preliminary obstruction was found to have made advances; the left lung became affected, from the base, like the right, until at last the respiratory function was shut off altogether, and death from pure asphyxia, without convulsion, closed the scene.

In this instance, as in the former, the mind remained unclouded until the commencement of the narcotism from asphyxia.

OTHER EXAMPLES BRIEFLY STATED.

These three cases are adduced as abundantly typical of the condition which I venture to name Pulmonary

Paresis, or rather Pneumo-paresis. I could give more. There is fresh in my mind a case in which I was consulted at a stage when no pulmonary lesion whatever could be detected, and in which, unable to form a definite prognosis, I could only state that the general symptoms were suspicious, but that, in the absence of the local, the prognosis might be favourable. Yet it proved to be a case of pneumo-paresis so determinate and rapid in its course that death from pure asphyxia took place within three days from the time of my visit.

In my notes is another case where the symptoms were recurrent, but in the end fatal.

One more example is named, finally, because it occurred in the male subject. The patient was a gentleman advanced in life, but considered healthy up to the time of his fatal illness. I did not see him while he was living, but was requested by his family to make a *post-mortem* examination, his death being very rapid and unexplainable in the ordinary experience. From the symptoms detailed to me, I was able to diagnose the condition of disease, which arose in his case, as it seemed, from exposure to extreme cold. The *post-mortem* corroborated the diagnosis. Both lungs were congested to the extremest degree, and there was a small serous exudation into each pleural cavity. There was no other lesion in the body to account for death. The right side of the heart was congested with blood, but the heart itself was healthy. The abdominal viscera and the brain were all healthy.

From this description of facts strictly and briefly rendered, I propose now to pass to the study of the nature of the affection to which the name *Pneumo-paresis* is applied, in order to distinguish the affection

from pneumonia proper, from asthma proper, from acute febrile congestion, and other special pulmonary lesions.

DEFINITION.

Pneumo-paresis, if I am correct, may be defined as a progressive congestion of the minute pulmonary circulation, with infiltration into the vesicular structure, ending, in fatal cases, by a gradual asphyxia. It is unattended by pyrexia, and is preceded by a distinctive train of purely nervous symptoms, consisting of emotional excitement, fugitive cutaneous erythema, extreme physical prostration, and short cough, without much expectoration. The mind is impressed with the idea of impending death, but is neither alarmed nor anxious. There is no acute pain at any stage. The symptoms run a rapid course, and one that is usually fatal. Women are much more subject to the disease than men; and women who suffer from neurasthenia and emotional excitability are those most liable to be affected.

PHYSIOLOGICAL PATHOLOGY.

The details given above describe a series of clinical facts which deserve to be carefully recorded, whatever theory may be offered respecting their cause. It would be quite legitimate to stop here and not to enter into any speculations in regard to causation. But after thinking the matter carefully over, I venture, with every desire to accept correction on a very refined point in pathology, to offer an hypothesis in respect to causation, although it may do no more than excite discussion on the subject.

The view I would submit as to the nature of this

disease gives to it a purely nervous origin. All the general symptoms, as well as the special, point to this view. The hysterical phenomena, the mental phenomena, and, most distinctly of all, the fugitive erythematous flushes, are peculiarly indicative of the seat of the disease. It is as if for the time a controlling nervous supply were disturbed, and as if the nervous supply to the lungs were so reduced that the resistance of the vascular mechanism was ineffective.

Hitherto experiments by stimulation of both the organic or sympathetic, and pneumogastric pulmonary nerves have failed to show how the vascular distribution of the two vascular currents of the lung, the respiratory and the nutritional, are regulated.

By another mode, by a synthetical research, I did, however, some years ago, detect that in the pulmonary, as in other organs, there is, as might be expected, a nervous regulation of the blood currents.

In my original paper on the physiological action of amyl nitrite, read before the Physiological Section of the British Association for the Advancement of Science at Newcastle in 1863, I pointed out that the effects produced on the body by inhalation of this nitrite were clearly due to an induced paresis or paralysis of the terminal part of the vascular system, and that the heart passed into vehement motion under the nitrite, not because it was excited by the agent, but because, the resistance to its action being removed, it ran down like a clock in which the resistance to the spring is broken by shortening the pendulum. In the next report I showed that, under the influence of the nitrite, the muscular system is brought into extreme relaxation, and that the nitrite might be used as a remedy for the relief even of tetanic spasm.

These views have been sustained by later observation. It remained, however, still to discover how far the relaxation of vessels from amyl nitrite extended to the functions of special organs of the body; and I followed up this research by tracing the changes producible in the pulmonary circulation.

I had observed, in making dissections of the bodies of animals that had died from amyl nitrite, that the condition of the lungs varied much; that sometimes the lungs were of milky whiteness, sometimes of leaden hue, and again of deep dark red hue. It occurred to me, at last, that these differences were not accidental, but that they depended upon the mode in which the nitrite destroyed the life of the animal. Thereupon I made direct inquiry into this subject, and was led to discover that I could, practically, modify the circulation of the blood passing through the lung, almost at pleasure; in other words, I learned that the vessels of the lungs are influenced by the nitrite like those of the skin.

The observation thus stated led me, naturally, a step further. I inquired as to the result of different temporary lesions that might be inflicted on the pulmonary organs by the nitrite, and what extremity of lesion could be recovered from under conditions favourable to recovery. The results of the labour were most important, and may be epitomized as follows in relation to our present subject:—

1. If an animal be destroyed by an overwhelming dose of the nitrite, so that it dies instantly, as it might die from syncope, the lungs are left absolutely bloodless and of pure whiteness. The right side of the heart is in this case paralyzed; but exposed to the air immediately after death, it often recovers its power

of contraction. In this instance the death is really by syncope; the paralysis is extended immediately to the heart, and the right ventricle failing to pour out its blood to the lung, death is so instantaneous that there is no time left for the production of any organic change.

2. If the death be comparatively slow, if it be preceded by a short interval of muscular prostration, and if it occur from paralysis of the muscles of respiration, then the lungs are left charged with dark tarry blood, but they contain air and are free of congestion. Here the lungs and heart have failed together, and the balance of the pulmonary circulations has been fairly maintained.

3. If the effect of the nitrite be more definitely prolonged, there is produced intense general congestion of the pulmonary vascular systems, a congestion so intense that the lungs, full of blood, dark and heavy, will not float in water. The cause of death in this instance is progressive paralysis of the pulmonary vessels; it is the equivalent of passive congestion of the lungs from long exposure to extreme cold.

4. The above may all be considered as acute changes in the pulmonary structures, and the two first-named changes are immediately fatal. The last need not be; for, as it occurs from prolonged and sustained action of the nitrite, in quantities insufficient to kill directly, the effects of sustained congestion may be traced out from day to day for many weeks.

To be accurate in the observations made on this subject, I constructed in 1865 a glass house or chamber of a capacity of three cubic feet, and so ventilated it that the air could be kept charged with the vapour of the nitrite. In this chamber rabbits and guinea-pigs were

housed. They were carefully fed, supplied with abundance of air, and well protected from cold. The introduction of the vapour was so moderated that the same quantity was equally diffused through the chamber each day.

Coldness of the air and a low barometric pressure greatly assisted the action of the vapour, and frequently led to sudden death from congestion of lung and accumulation of fluid in the bronchial tubes.

In some drawings placed before the Society, the precise changes induced in the lung under the circumstances related are faithfully depicted. These are shown in the first series, and are most distinctive. In the animals here subjected to the nitrite, there were evidenced all the objective symptoms recorded in respect to the human subject under acute pneumo-paresis. There was quickened circulation without fever; flush of blood in vascular external parts, as the lobe of the ear; prostration of physical power; and gradual death from asphyxia, without convulsion.

Returning to pneumo-paresis in the human subject, the primary lesion is, I cannot but think, in the organic nervous centres which in health regulate and control the pulmonary circulations. All the symptoms, physical and mental, or emotional, indicate this fact. But here we require new light, before we can see clearly the character of the nervous supply of the lung and of the two vascular systems which, as in no other organs of the body, are present in the pulmonary organs. We usually trace the nervous supply of the lungs from two sources: the pneumogastric, which is cerebro-spinal, and the sympathetic. We assume that there are two pulmonary nervous plexuses: one situated

at the anterior part of the root of the lung, consisting chiefly of sympathetic filaments, the other at the posterior part, consisting chiefly of pneumogastric filaments, with some from the recurrent laryngeal branch, intermingled with a few sympathetic branches derived from the deep cardiac plexus, the *plexus magnus profundus* of Scarpa. But whether the branches of the pneumogastric accompany the sympathetic along the distributions of the pulmonary artery and of the bronchial arteries coming from the thoracic aorta by which the structure of the lung is fed, or whether they are distributed, exclusively, to the bronchial mechanism, has not yet been demonstrated satisfactorily.

Admitting for the moment that the origin of the affection under consideration be of nervous origin, a paresis, we encounter a new difficulty in relation to the vascular changes. Do these begin in the respiratory vascular circuit or in the nutritional circuit, in the pulmonary artery or in the bronchial arteries?

I have thought much on this point, and, balancing all the facts, the evidence, in my opinion, weighs towards the idea that the nutritional circulation is the first that is embarrassed. The understanding of this point, scarcely studied up to our time, is one which affects every class of pulmonary disease, but none more than the one now specially before us. I think, the nutritional circulation is primarily affected, because we have in pneumo-paresis the general signs of disturbance in the lung before any physical signs are presented, a condition which would scarcely exist if the respiratory circulation were the first to become impeded. I mean that there may be great interference in the function of the lung before any physical signs from percussion or auscultation, which

are essentially respiratory signs, are manifest, supposing, as is most probable, that the nutritional circulation of the ordinary bronchial supply feels the preliminary failure before the respiratory.

Leaving the question of primary vascular change *sub judice*, I come next to inquire into the nature of the predisposing cause which leads to impaired function of the vascular pulmonary system. There may be one of three predisposing causes for the failure :—

1. The cause may be mechanical : pressure or injury.
2. It may be due to the generation within the body of some chemical product which, like nitrite of amyl, affects the nervous supply and the balance of the pulmonary circulations.
3. It may be due to hereditary fault, disposing to premature nervous failure under exhausting or depressing influences.

The first of these supposed causes, the mechanical, must, I think, be set aside. It is true that in one of the most marked cases there had been a preceding injury. But I could only connect that with the paresis by supposing that a concussion had been communicated to a nervous centre already in an exhausted state, by which the exhaustion had been increased.

The second hypothesis, that in the body itself a substance is produced which causes the paresis, is worthy of thought. I believe that hysteria is essentially produced in this way, as well as some other transient nervous affections, like somnambulism and melancholia, and I should hold by the hypothesis now if the symptoms were transient. But it was always observable in the animals in which the pulmonary paresis was induced, synthetically, that they recovered so soon as they

were withdrawn from the cause. If therefore in the pulmonary paresis affecting the human subject, in disease, a chemical product made in the body were the cause, the making of that product must be a continuous process until death takes place, and this is not an improbable result, since we see it in process in diabetic cataract and in symptoms of other diseases which evidently depend on the presence of a foreign substance that is being persistently constructed in the body by the body. The objection to the hypothesis is, rather, that the failure would not be limited so closely to one centre if the cause were universally distributed by the blood.

The third hypothesis, which assigns an hereditary predisposition, is the most comprehensive and the most probable. We have seen in the examples quoted that in every instance there was a peculiar heredity, indicative of nervous irregularity or exhaustion. Such irregularities and such exhaustions commonly show themselves from one centre, and all cases of local paresis which are not from accident are more or less so represented. There is, therefore, if nervous regulation be admitted, nothing specially peculiar in an arrest of the nervous supply of the pulmonary circulations. We have only to become accustomed to the thought of such an event, as we would of failure from the same event applied to other organs, and the study is simple enough. But what a field it opens for observation!

Probably most of the aged and infirm die, as by a natural anæsthesia, from this very failure, under the mere added influence of cold, fatigue, privation, fear, grief, or some other temporary depressing influence.

TREATMENT OF PNEUMO-PARESIS.

I am brought now to the all-important subject of the treatment of pneumo-paresis.

In the cases which have been related no attempt at anything which could be called specific treatment was made.

We were obliged to follow the tentative plan of meeting the more urgent symptoms as they arose, and an almost uniform method in this direction was pursued. The patients were all supported by light but generous food, and in two of the cases wine was rather freely administered, with, I am sure, a doubtful, if not an injurious, effect, for it increased the excitement and quickened the pulse without giving any relief in return.

In the first case, as already indicated, digitalis was prescribed with acetate of ammonia, and Dover's powder was also given at night. These remedies caused free diaphoresis, but did not in any way arrest the pulmonic lesion. Valerian, camphor, and other antispasmodics were administered, and sinapisms were freely applied, but without effecting anything more than temporary change or relief.

The second case had been treated up to the time of my arrival with salines, ammonia, and opiates. I suggested the addition of tincture of ergot, and it was taken regularly, but I could not venture to say that it rendered any material service.

In the third case ammonia and infusion of cinchona were administered freely, together with sedatives and counter-irritation. I thought if the blood were rendered more fluid by the alkali, that perhaps the pulmonary circulation would be carried on more freely; but again

I can only record negative results. Indeed, under all these lines of treatment the symptom of gradual and determinate failure of respiration, from the changes going on in the lung, followed an unbroken course.

This record of treatment and its results is discouraging, and I must honestly confess that if I were called again to a case of pneumo-paresis, I should be obliged to feel that no specific method, at once rationally and radically curative, was at hand. Indeed, in this, as in many other instances, it would seem as if treatment receded just in proportion as a precise knowledge of causation and of cause advanced.

The problem is clear, but how is it to be solved? The problem is:—

Given a condition in which the organic nervous supply of the pulmonary circulations is suppressed or reduced from any cause at the centre of that supply, how shall the central failure be restored?

All the “pathies” would seem to be dumb on this question.

Empirical observation of treatment, sometimes so true, although empirical, affords no light, for it has neither recognised the affection nor isolated it from pneumonia, or rather from the many conditions of disease known under that general term.

We might relieve by the inhalation of oxygen at 75° Fahr., and by prolonging life give time for restoration of nervous balance, and this is the course I shall adopt in future. But it is not radical cure, and we shall have to wait, I fear, many a long day before we can apply that method definitely to the treatment of pneumo-paresis.

I have fulfilled my task for the moment if I have defined the problem of cure, and have gained your

attention to a dilemma which can only be solved
consilio animorum.

POSTSCRIPT.

Since the above paper was read before the Medical Society I observe that Dr. Augustus Waller has very acutely directed attention to the negative experimental evidence regarding "vaso-motor" pulmonary supply. I was quite prepared for this criticism and recognize its importance, although I feel it to be corrected by the observation of what occurs in the pulmonary circulations under amyl nitrite and other volatile substances, which admit of being received directly by inhalation, and which can only, as it seems to me, produce the effects observed by interference with nervous action. Another criticism, in the *Medical Record* of New York, that the "pulmonary vessels have no 'vaso-motor' nerves," derived, I suspect, from Dr. Waller's much more cautious observation, is too dogmatic to call for comment. If it be the fact that the two vascular currents in the lung are under no nervous governance, one of the most anomalous conditions of circulation is present there.

THE ART OF EMBALMING.

THE ANCIENT METHOD.

N the three methods of disposal of the dead most commonly practised in the different stages of the human history of this planet—viz., burial, or concealment of the body in the earth ; cremation, or destruction by fire ; and preservation, by “embalming”—many learned books have been written and much controversy has been waged. Which of the three modes was first instituted? What particular nations favoured one mode in preference to the other? What was the ideal that prompted preference for either method?

As it seems to me, the natural course of history on this subject is exceedingly plain and simple. The custom of savage life, to leave the human dead to the carnivorous birds and beasts, passed readily enough, and with little development of refinement, into the more humane practice of hiding the bodies, from these animals, in the earth, and to the second primitive stage of disposal, which, on the whole, has outlived all other methods—viz., burial in earth. We trace this custom of burial in countries of wonderful civilisation, even after other, and, as it was assumed, more refined, practices had generally replaced it. Thus, in Greece,

where cremation was the established custom, and interment, except under special circumstances, was interdicted, the traveller who should find a dead body was enjoined to bury it, or, if he could not do so much, to cast dust of earth upon it three times—

*“ Quaquam festinas, non est mora, licebit
Injecto ter pulvere curras.”*

Indeed, such was the anxiety of the early Greek in respect to decent burial, that Pluto, who taught first the rites of burial, was raised, like Æsculapius, into the number of the immortal gods. No deeper curse could be passed from one person to another than that which conveyed the wish that the cursed should have no burial; so when the sailor died at sea, he was consigned to the deep with horror, bearing on his body the most costly gift he could bear, with the request that, if on some friendly shore he were cast and found, the finder would accept the reward for the trouble of burial.

Later on, in the course of civilisation, new ideas sprang up respecting the continuance of man as a veritable existence, destructible or indestructible, or, as the poets would have it, mortal or immortal. As the intelligent part of human nature became developed, the value of that intelligent part rose in estimation, while, in respect to matchless intelligences manifested in man, it was accepted as impossible that with the dissolution of the grosser or material parts of the organism the whole could resolve. At the same time, the mind, unable to isolate its idealisation of spirit and matter, could hardly receive the conception of a great intellectual unembodied force. Thus heroic men were crystallised into imaginary figures of gods, and in time

the notion was conceived of retaining the matter for the re-reception of the spirit. Thereupon sprang forth two methods of disposal of the dead—one, the subjection of the body to fire; the other, the subjection of it to a process that should save it from decay. Strange it may seem, that two plans so different in effect should have the same origin. Yet the fact is so.

The institution of the process of burning the body, from whatever source or suggestion it may have been derived, had no touch of materialistic feeling. The men who transformed their greatest men into gods, and who carried out their young dead to the funeral pile before sunrise, that the sun should not be the witness of so terrible a calamity as the cessation of life while yet it had not neared its perfected glory, were not men tainted with the doctrine of negation after death. Not at all! The burning to which they subjected the dead body was to them a process of purification for the soul, which, left unclean in its earthly state, required to be made perfect by the absolute purification of the case—ment in which it had been enshrined on the earth. They subjected it, therefore, to the *pur*, the great purifier—the fire. Further, they thought in this purification that they the sooner set free the indestructible principle of life, to enter the more speedily into the domains of the blessed. This was the Greek ideal of cremation; and it colours still many thoughts of man. It is the root of a faith to the present hour, though differently symbolised.

The process of embalming had its origin in a similar but in another current of development. The noblest human representation was by the Greek subjected to the most consummate purification, that it might be freed of dross of earth. By another intellectual process

the effort was attempted to preserve the animal body so that it might, in the course of the suns, and at some strange and eventful moment, be united with the principle that had left it, and revivify. Again, in this ideal projection, we see the origin of a thought that remains still in the many thoughts of mankind, the root of a faith symbolised differently, but a faith of millions of our race.

The art of embalming, founded on this last-named ideal, developed—gained a second hold, I might say—from the lower or instinctive interests of humanity. It led to the retainment of those who on earth had been loved and admired, nearer and longer, as it seemed, with those who lived to love, to remember, to admire. For this reason the practice of embalming great personages has retained its place, while recently, in a country amongst the most civilised and the most advancing—America—the practice has received advancement, not merely in its application to the great dead, but to the dead generally, amongst those in whom the tie of attachment is closest and most abiding. It is proposed in the next few pages to describe, briefly, the embalment process as it was anciently practised, leaving the modern practice of the art for a future study.

THE ANCIENT ART AND PRACTICE OF EMBALMING.

The first notice we have of the art and practice of embalming comes from the Egyptians, and we are not only well informed of the methods they pursued, but are made cognisant of the results they obtained, by the specimens of preserved bodies which they have left to us. From their time the practice has proceeded, with certain modifications of detail, which have come down to our

own time. We may divide the practice into three parts :—

1. Into embalming proper, by the introduction into the body of certain odorous essences or antiseptics, aided by after-immersion in saline solutions.

2. Into preservation by simple extraction of water from the tissues—desiccation.

3. Into preserving by the injection of preservative solutions into the blood-vessels.

The first of these lines of practice includes the true Egyptian and Græco-Egyptian process of preservation, and it is most carefully related for us by the Father of History. Herodotus, travelling through Egypt, was struck by nothing more than the divisions of labour in learned work. The Medical fraternity he discovered divided into almost as many specialities as there were parts of the body ; a fact to his mind—instructed as it must have been in the harmony and unity of natural phenomena taught by the higher school of philosophy in Greece—presenting a singular anomaly. Amongst other specialists he found the embalmers, a class hybrid between Medicine and Divinity, making a certain profession of both, yet hardly belonging to either. These professors of the art embalmed somewhat differently, according to the wealth of the embalmed and the fee of the embalmer. They were legally appointed to the exercise of their profession, and when a dead body was brought to them, they exhibited to the friends of the deceased different models highly finished in wood. The most perfect of these they held to resemble one whom the Father of History did not think it religious to name—this was the most expensive model ; a second was of less price, and inferior in point of execution ; and a third was meaner

still. They then inquired after which model the deceased should be represented, and when the price was determined on the relations retired, and the embalmers proceeded with their task.

In the most perfect embalmments, they drew the brain through the nostrils, partly with a piece of crooked iron and partly by the infusion of drugs; they then, with an Ethiopian stone sharpened like a knife, made an incision in the side, through which they extracted the intestines; these they cleansed thoroughly, washing them with palm wine, and afterwards covering them with pounded aromatics. They next filled the body with powder of pure myrrh, cassia, and other perfumes, except frankincense. Having sewn up the body, it was covered with *natrum* for the space of seventy days, which time they might not exceed. At the end of this period the body was washed, closely wrapped in bandages of cotton dipped in a gum which the Egyptians used as glue, and returned to the relations, who enclosed it in a case of wood made to resemble a human figure, and placed it against the wall in the repository of their dead.

The above was the most costly way of embalming. For such as chose the middle mode, from a desire of avoiding expense, the embalmers first filled syringes with cedar oil, which they injected into the body per anum, without making any incision or removing the viscera; they then closed the apertures of the body and laid it in brine the specified number of days, on the last of which days they removed the cedar oil which they had previously injected, and with it—such was the strength of it, as they thought—the viscera also, in solution; at the same time the *natrum* had reduced the flesh, so that there was

nothing left but the skin and the bones. They then gave back the body without any further operation to the friends who owned it.]

The third mode of embalming, which was used for such as had still scantier means, was as follows:— After washing the inside with *syrmaea* the embalmers salted the body for seventy days, and then returned it to those who owned it.

Between four and five hundred years after Herodotus, Diodorus Siculus, writing on the same subject, shows how little the art had changed since the time of the Father. Those, said he, who have the care of ordering the body are such as have been taught the art by their ancestors. These, showing to the kindred of the deceased an estimate of expenses of each kind of burial, asked after what manner the body should be prepared, and when the terms were agreed upon the body was delivered over to them, and they thus proceeded. First, he who bore the name of *scribe*, laying the body upon the ground, marked upon the flank on the left side how much was to be cut away. Then he who was called the cutter or dissector, with an Ethiopic stone cut away as much of the flesh as the law commanded, and presently ran off as fast as his legs would carry him; those who were present pursuing him, casting stones at him and cursing him, thereby turning all the execrations which were due to his office on him: for whosoever offered violence, wounds, or any kind of injury to a body of the same nature with himself, they thought worthy of hatred; but those who were called the embalmers they esteemed worthy of honour and respect, for they were familiar with the priests, and went into the temples as holy men, without any prohibition. So soon, then, as one

of these came to embalm the dissected body, he thrust his hand through the wound and drew out all the viscera except the heart and kidneys, after which another operator washed and cleansed the viscera with wine made of palms and of substances of aromatic odour. Lastly, having washed the body, the embalmers anointed it with oil of cedar (or cedria) and other aromatics for about thirty days, and afterwards treated it with myrrh, cinnamon, and such like materials, which had not only power to preserve it a long time, but to give it a sweet smell; then they delivered it to the kindred in such manner that every part remained whole and entire, no part of it changed, the shape and beauty of the face as before death, so that it could be known; even the hairs of the eyelids and eyebrows remaining as they were. By this means many of the Egyptians, continues Diodorus, "keeping the dead bodies of their ancestors in magnificent houses, see so perfectly the true visage and countenance of those that died many ages before they themselves were born, that in viewing the proportions of every one of them and the lineaments of their faces, they take as much delight as if the dead were still living among them."

We gather from these histories that the Egyptian method of embalming consisted really of eviscerating, of employing aromatic preservatives, and of exposure of the body to a saline solution—in plain English, pickling. It has been argued by some authorities that the exposure of the body to the saline substance was the first part of the process, and the filling of the cavities with aromatics the last; but the whole argument, beyond what is stated by Herodotus and Diodorus, is merely speculative. It seems clear that the Egyptians used an aromatic powder—a mixture of myrrh and cassia—a strongly preserva-

tive compound; and it also seems clear that they used the oil of cedar, and that sometimes they injected this oil into the cavities. The saline substance they employed does not appear to have been saltpetre, but either chloride of sodium (culinary salt), or a mixture of that salt with soda. The saline substance taken by Mr. Pettigrew from a Græco-Egyptian mummy, and chemically examined by the late Dr. Ure, proved to be composed simply of common salt. It is clear in some instances—instances, I presume, where the embalmer received his highest fee—that the description by Herodotus does not supply the details of everything that was carried out by the operator, for we find, in the actual mummies still remaining, the most extensive and skilful bandaging, and also evidence of the employment of bituminous substances—asphaltum and pissasphaltum. The former was a pure bitumen, called in later centuries *bitumen Judaicum* (Jew's pitch), while the latter was a mixture of Jew's pitch and common black pitch. To these was probably added the oil or essence of some aromatic, such as cedar. In some mummies this bituminous matter has been found in the cavity of the skull and in the ventral cavity; in other specimens the whole body had clearly been immersed in the bitumen before it was bandaged. The bandaging was made with light but rather coarse cloth, somewhat resembling canvas, and was carried apparently from the lower limbs to the upper part of the body, including the head itself, and back again, in layers, several times.

In the most costly specimens, gilding of the surface of the face and of other parts of the body was practised, and with such perfection that specimens of it have been retained in good preservation to the present day.

The results secured by the embalmers of Egypt in the ancient times, however crude they may seem, were good when the highest development of the art was practised by them. This is proved by the specimens that have come down to us. My distinguished friend, George Cruikshank, once made a drawing of the face of a Græco-Egyptian unrolled by Mr. Pettigrew at the Charing Cross Hospital, on April 6th, 1833. Mr. Cruikshank told me that the features of this preserved man, preserved over two thousand years, were so perfect, that there was no difficulty in the task of making an accurate representation of them. The soles of the feet were quite soft, and yielded readily to the pressure of the fingers, while, at the same time, they showed elasticity of structure. The face in this case had been gilded, as had also the upper surfaces of the feet, the thighs, abdomen, and chest. The full account of this mummy will be found in Mr. Pettigrew's admirable work on the "History of Egyptian Mummies": suffice it only to add now, on the authority of my friend, that the immortal Græco-Egyptian, embalmed and gilded regardless of the embalmer's highest fee, and lying over two thousand years in useless preservation, passed speedily in this commercial age into a means of affording quick returns on small profits. The last time Mr. Cruikshank met his antique friend, who gave him so strange a sitting, the said antique was enshrined in Seven Dials for the sake of being seen for the sum of one penny per visitor.

"Imperial Cæsar, dead and turned to clay,
Might stop a hole to keep the wind away."

My late friend's antique out-Cæsars Cæsar.

The term embalming is applied to the Egyptian art of preserving the dead because preservative balsam

or balm was used in the process—*baal-samum*, prince of oils. Much speculation has been offered as to the kind of balm used by the Egyptians, and Prosper Albinus, learned in all such matters, describes with infinite care the plant yielding the balsam, the mode of obtaining it by incision of the branches (called *opo-balsamum*), and the balm itself. The fluid was whitish at first, and turbid, of a strong pungent smell, like turpentine, but much sweeter and more fragrant, and of a bitter, acid, astringent taste; on being kept it became thin, limpid, light-greenish, and then of golden yellow; after which it again became thick, like turpentine, and lost much of its fragrance. Its smell resembled that of citrons, or rather a mixture of rosemary and sage-flowers. The use of this balsam was, I conclude, confined to the highest class of embalmments, and it was probably mixed with the other aromatics with which the cavities of the body were filled. Bodies thus prepared retained longest their natural condition of structure and feature.

The viscera removed from the body by the Egyptian embalmer were placed in a separate vessel, and, with a sort of funeral prayer, addressed to the “sun and all the gods givers of life, were cast into the Nile.”

Such in brief was the Egyptian method of embalming, and, with a few modifications of detail, their method was copied by all the neighbouring nations. The Jews introduced aloes into their preparations, and some other changes from the primitive plan were carried out; but on these we need not dwell.

One marked difference of mode does, however, remain to be told. Herodotus records that the Ethiops *desiccated* the bodies of their dead, painted the dried bodies so as to represent life, and, finally, enshrined them.

in columns of transparent solid substance, so that they could be seen by the living. For one year the dead man, thus crystallised, was kept in the house of his friends, after which time he was removed, and was set up in the town where he had lived. What the nature of the transparent substance used to envelope the dead might have been is not known. It has been assumed to have been glass; it has been assumed to have been amber, or a fossil crystal.

We travel from these early times through many centuries, never historically to lose sight of the art of preserving the dead by one or other of the methods named. Camerarius, the author of that quaintest of quaint old books, "The Historical Meditations," tells us that brass was considered to be a preservative of the dead, and that on this belief rests the custom of using brass in the coffins that receive the dead. He, too, quoting from Gyrالد de Cambrea, affirms that people in the Isle of Arran will not putrefy after death, so that the bodies of the Arrans are naturally preserved. Further, he tells us, on the authority of Peter Martyr, that the Spaniards found at Comagna, in the New World, a chamber of a cacique full of the dried dead bodies of his forefathers.

The statement by Peter Martyr is sustained, in respect to the inhabitants of Peru, by Garcilasso de la Vega, who, however, described a process of preservation different from desiccation. The Peruvians, he says, embalmed the bodies of their kings by burying the corpses in sand, to dry them; after which they applied to the bodies a kind of bitumen, which kept them in such entirety, they seemed as if they had been alive. The same people of Peru have continued the practice of pre-

servation, principally by desiccation, until a late day, the bodies of the dead being placed in sand and exposed to the heat of the sun. These bodies have commonly, when they are unearthed, a crouched sitting position ; they are little more than skeletons covered with dried skin.

Pettigrew, quoting from Glass's "History of the Canary Islands," takes from a translation of an ancient Spanish manuscript an account of the manner in which the people of the Canaries preserved their dead. They carried the dead body in a case, stretched it out on a flat stone, opened it, and took out the bowels ; then twice a day they washed the porous parts of the body—viz., behind the armpits, behind the ears, the groin, between the fingers, and the neck with cold water. After sufficient washing, they anointed those parts with sheep's butter, and sprinkled them with a powder made of the dust of decayed pine trees, and a sort of brushwood which the Spaniards called *bressos*, together with the powder of pumice-stone ; then they let the body remain until it was perfectly dry, when the relatives came and swathed it in dressed goat-skins, girding all tight with thongs of leather. The body was finally placed in a cave. In some cases amongst the Guanches, the cavities of the body, after being washed with salt water, were made to receive aromatic substances, and the whole body was then dried in the sun or in air artificially heated. The same authority (Pettigrew) records that at Palermo, at the Convent of the Capuchins, the bodies of the monks were all preserved, the skin and flesh, by some process of petrification, being rendered quite hard, so as to resist decay. These bodies, habited in the clothes they usually wore, were preserved in the standing posture.

In Burmah the bodies of priests are still subjected to a peculiar process of embalming. The plan is to eviscerate, to fill the cavities with aromatic spices and honey, and afterwards to coat the whole external surface with a layer of vegetable wax, on which gold-leaf is laid. Another practice by these same people related by Pettigrew, on the authority of Captain Cook, a practice of thrusting hollow bamboo canes from the soles of the feet into the body, and of injecting preservative fluids through these tubes, is now unknown.

EMBALMING IN A LATER AGE.

The methods of preserving the dead, as sketched above, have been limited to particular communities. But the universal method that prevailed for centuries was, practically, the Egyptian. By this method for two thousand years the great potentates of the earth were held in a little longer suspension against nature, the mode of procedure passing down by tradition, and known but to a few practitioners of the art. Such modifications as really occurred in the art are quickly related. Lewis de Bils, in 1750, proposed to embalm without evisceration of the body. After him, Gabriel Clauderus, in 1769, introduced the plan of injecting into the cavities of the body what he called his "balsamic spirit," which consisted of one pound of salt of tartar, half a pound of sal-ammoniac, and six pounds of water. Into this same solution he also immersed the whole body, and allowed it to remain immersed eight weeks; after which he dried it in the sun or in heated air. Some time after Clauderus, it became the practice to make incisions into the bodies of the dead that were to be preserved, and to insert into the incised parts

tincture of myrrh or other similar antiseptic substance. Lastly, there came into operation an improved covering for the embalmed—a cere-cloth coated with wax, oil, and aromatic preservatives. The whole process, as it was carried out a little more than a century ago, is described in the following directions by two of the ablest surgeons England has ever produced—I mean Benjamin Gooch, of Norwich; and the great authority of the last century in class-book surgery—Benjamin Bell, of Edinburgh.

“After evisceration,” says Gooch, “as has been directed in opening a dead body, and continuing the incision farther upwards—even into the mouth, and, if practicable, without cutting the skin of the neck—all the cavities are to be well cleansed, and the humidity sucked up with sponges, then washed with *tinctura myrrhæ*, and filled with *a species* compounded of fragrant herbs, aromatic drugs, and gums reduced to powder, not very fine, first restoring the heart to its former residence, after having opened its ventricles, cleansed and washed them with the tincture, stuffed them with *the species*, and sewed them up; and then the cavities are to be stitched very close with the glover’s or spiral suture. Large and deep incisions are also to be made in all the most fleshy parts, cleaning and washing them with the tincture in the same manner, filling them with the antiseptic *species*, and stitching them up. Then the head, trunk, and limbs are to be perfectly well covered with cere-cloth; putting a piece under the chin, to be secured by sewing on the top of the head; after having well adjusted the cap of the skull, sewed the scalp together, and cleaned the mouth, as has been directed for the other parts, and putting in some of *the species*. The cere-cloth is to be prepared with a com-

position made of wax, resin, storax, and painter's drying oil S.A. After the application of the cere-cloth with great care and exactness, cut into suitable pieces, according to the respective parts, and closing them well everywhere, the face, being close-shaved, is to be covered with some of the above composition, melted and laid on with a brush of a proper degree of heat, and of a moderate thickness—and it may have a faint flesh colour given to it with vermilion; and when it has grown cold and stiff upon this part, it may be lightly struck over with hard varnish—or this varnish, applied thick, may here serve the purpose alone. A cap is to be well adapted to the head, falling down upon the neck, and to be sewed under the chin, making a few circular turns about the neck with a roller of a fit breadth. All the rest of the corpse is to be enclosed in a sheet, to be artfully cut, and sewed on very close and smooth with the finest tape, over which an appropriate dress is to be put, as the relations or friends think fit to direct and appoint, and then laid into a coffin, which should be in readiness; but when it is some great personage, who is to lie in state for public view before the funeral rites are solemnised, the dress must be appropriate to his dignity and character. The brain and other viscera are to be put with some of *the species* into a leaden box. Sometimes the heart, prepared as has been directed, to preserve it from putrefaction, is deposited in an urn by itself."

The following, says Bell, is "the present method of embalming:—The brain and all the viscera of the thorax and abdomen being removed, they are all, excepting the heart, put into a leaden box with a considerable quantity of an aromatic antiseptic powder, prepared with myrrh, frankincense, cloves, the leaves

of lavender, rosemary, mint, sage, and other similar articles, and to these are added a proportion of any odoriferous oils. The blood being removed from the different cavities, and the heart replaced, they are all filled with the same kind of powder, with a due proportion of odoriferous oils or spirits, and the parts afterwards sewed up. By some, too, the mouth and nostrils are stuffed with these powders and oils; and incisions are made into all the fleshy parts of the body, which are also stuffed with them, and afterwards sewed up. But there is no necessity for this, unless the body is to be kept for a great length of time, or to be carried to a considerable distance: in which case it is usual, after stuffing the incisions in the manner we have mentioned, to roll all the extremities, as well as the trunk of the body, firmly up with bandages, and to cover the whole with varnish.

“The body is now to be laid upon a cere-cloth of sufficient size, which must be applied with as much neatness as possible to the head and every part of the body, and must either be firmly secured by sewing or with tapes tied at proper distances. The cere-cloth is made of linen dipped in a composition of wax, oil, and rosin, which should be of such a consistence as to be sufficiently pliable, without being so soft as to stick to the fingers of those who apply it. It may be coloured with verdigris, red lead, or any other article, according to the fancy of the operator. When two cere-cloths are applied they are usually made of different colours.”

With Gooch and Bell, the ancient process of preserving the dead, by embalming proper, ceased, and a new era in the art was developed.

OPUSCULA PRACTICA.

"There are mites in science as well as in charity."

BENJAMIN RUSH.

TESTING FOR AMMONIA UNDER AMMONIA TREATMENT.

WHEN ammonia is being administered in large doses for a long time, it is important to ascertain whether the blood is thoroughly under its influence. This may be determined by two methods, both of which should be carried out—one a test from the breath, the other from the blood itself. In the breath the presence of ammonia may be determined by holding a glass rod, moistened with hydrochloric acid, for the patient to exhale on; when, if ammonia be expired, the white characteristic fumes will be developed. This test, however, is not very satisfactory. It is better to place a drop of pure hydrochloric acid on a microscope slide in a strong test-tube, with a neck holding a stopper per-

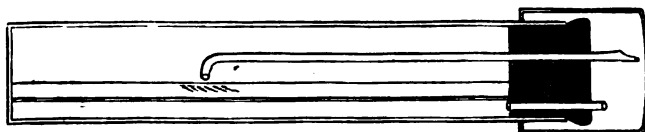


Fig. 1.

forated in two places, as depicted in the above plate (fig. 1). One of the openings is armed with a mouth-

piece, and the whole is covered in with a well fitted glass cap. The tube being prepared for use, a microscope slide is moistened at one point with a minim of pure hydrochloric acid, and is inserted in the tube; the stopper and glass cap are then adjusted, and the apparatus may be carried in the pocket safely. When the tube is to be used, the glass cap is removed, and the patient is made to expire gently by the mouth through the mouth-piece some twenty times. The cap may then be replaced, and the tube removed. Before microscopical examination the cap is taken off, and the tube, the stopper still in it, is placed near a fire, or at a little distance from the flame of a spirit-lamp, in order to allow the ammonium chloride that may be formed, to crystallise on the slide. When this is effected, the stopper is lifted out, and the slide is ready to be placed under the microscope for examination. The advantages of this tube are : 1st, that it is portable ; 2nd, that in use nothing but the expired air of the patient comes into contact with the acid ; and 3rd, that the evaporation and crystallisation are performed with as little exposure to the air as is possible.

A few experiments with this tube on healthy persons will indicate that, under most circumstances, crystals of chloride of ammonium are produced after expiration through the tube when the slide has been charged with hydrochloric acid. But practice soon points out the extreme amount of the crystalline body that can be produced in health by a fixed number of expirations, so that comparisons between healthy production, and that occurring after the administration of ammonia, are easily and practically learned. In health, the crystalline deposit is thin and scattered ; after free administration of ammonia, if the action of the skin or kidneys, or of

both, be not profuse, the slide is frosted with the salt, as shown in figure 2.

In administering ammonia, it is essential that the medicine be pushed to the extent of showing a free evolution in the breath. But, while this point is to be insisted on, it is essential that there be a limit to the



Fig. 2.

administration ; for if the alkali be carried too far, it acts, by its solvent power, on the blood-corpuscles. It is well, therefore, nay requisite, also to examine the blood microscopically during the administration ; when, if the red corpuscles while still in motion present the appearances marked A. B. C. D. E. F. G. in figure 3, that

is to say, if the discs be crenate, or irregular, or transparent, or collapsed, or oval, or very diffuse—the

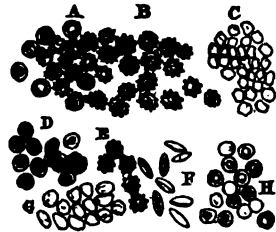


Fig. 3.

indications are given that the alkali requires to be reduced in dose or suspended altogether.

HICCUP AS A SYMPTOM IN ACUTE DISEASE.

IT has occurred to me that of late years hiccup is not so common a symptom as it formerly was in cases of acute disease. I never got, from any source, a good explanation of the cause of hiccup, nor of the reason why it should ever form part of the closing phenomena of life. I was taught that it was a spasm or convulsive action of the diaphragm, and I have seen instances in which it appeared to be the determining cause of death. Sir Thomas Watson, whom I often met in consultation, attached great importance to this symptom; and, in one case, in which we were both concerned, the persistency of an intractable hiccup was the basis of his prognosis—which unfortunately proved to be too true—that the result would be fatal. In pneumonia, in peritonitis, in typhoid, it was a very frequent and unpleasant sign; whilst in some other diseases equally acute, and equally dangerous, it was rarely seen. I never saw it in acute

cholera, nor in scarlet fever ; nor, singularly enough, not once in the many examples of fatal collapse from obstruction to the course of the blood through the heart, to which I have so often been summoned.

The reminiscences of the phenomenon of hiccup lead me to the belief that it indicates some special disturbance of the pneumogastric, and that its presence invariably indicates serious gastric or pulmonary lesion if it be frequently recurrent or persistent. But that which it is my object specially to refer to at this moment is the fact, if the observation be correct, that the symptom is ceasing to be so common as it once was in the cases in which it was most frequently manifested ; and, at the risk of being thought a biassed observer,—which, by the way, is never the fact,—it seems to me that the cause of the comparative absence of the symptom is the reduction in treatment of the large quantities of alcoholic stimulants that were formerly administered in acute disease whenever the powers of life began to fail. We know how alcohol excites hiccup in persons who are supposed to be healthy ; and I have not the slightest doubt that, in the worst examples of it remaining in my memory, the symptom was sustained, if not originally excited, by the use of stimulants. In our blindness of mind we were led actually to administer alcohol in order to cure a symptom which it so easily produces, that its action, in this respect, has become a vulgar illustration of its potency. In other words, we produced what Dr. Alfred Carpenter has so aptly called “ drug symptoms,” and confounded them with the symptoms naturally incident to disease.

THE PHYSICAL RELIEF OF MENTAL EXCITEMENT.

WHEN an animal or person is in a state of mental excitation, relief is often sought by physical movement. A wild animal runs about in its cage ; a man runs or walks off the oppression he experiences. It would, at first sight, seem as if the combination of the two kinds of excitement would increase the oppression and the danger, for both quicken the heart and relax the tension of the minute peripheral circulation. The fact, however, stands differently ; the mental excitement is quieted by the physical. The explanation appears to me to be that the physical excitement catches up, so to speak, the mental, and prevents the circulation from becoming suddenly exhausted on withdrawal of the extra mental stimulus. A little longer continuance of the mental over-action, and with the necessary failure of that over-action there would be syncope or collapse ; but under the physical impulse, a new part, purely motor, of the nervous system takes up the burthen, the spinal cord relieves the brain, and the mental organs having time to recover themselves, the balance or equilibrium is restored. Thus we do, in truth, walk off our annoyances, and by healthy exercise relieve the worries and troubles of the mind.

The above applies to perturbed or violent conditions of mind, but in another way it applies also to less demonstrative states and conditions. The student, the writer, the reader who feels the oppression of excessive mental work holds proof in hand, when he construes the fact naturally, that his mental excitement has, unconsciously in this case, worked out his heart. He takes a moderate walk, and is restored to equi-

brium. That is the natural cure,—a cure every over-worked man ought to know and act upon.

DEGREES OF MUSCULAR IRRITABILITY.

THERE are three degrees of muscular irritability—the active efficient, the passive efficient, and the inefficient or negative. The muscles after death may be suspended in any of these conditions; but, as a rule, it is the last condition only that is maintained long after death.

Muscular irritability may be suspended or stopped altogether under three different states, having reference to its connection with nervous activity:—(a) The nervous and muscular activities may be suspended equally, on which there may follow spontaneous return of motion. (b) The muscular irritability may outlive the nervous function, on which the phenomenon of irritability may be induced by the application of the motor forces, but without the return of spontaneous irritability, *i.e.*, of irritability belonging to the animal as an independent agent. (c) The nervous function may outlive the muscular irritability, under which circumstance irritability is invariably stopped by the production of persistent contractility of the muscular fibre.

Nervous activity exciting muscular action is identical with all the motor forces, and particular to none. It is equivalent to mechanical, calorific, or electrical force, and is susceptible of manifestation through either.

Muscular irritability after death is possible under conditions which, so far, are thus known. Cold, in certain defined degrees, suspends without destroying

it. The motor forces strike it into rest. Blood sustains it or stops it according to the balance of power existing between the muscular and nervous systems. Some chemical agents suspend it independently, others suspend it, together and equally, with suspension of the nervous function. When suspension is equal there may be spontaneous return of irritability; when it is unequal there is no return.

TANNIN WOOL.

IN treating ozæna and other diseases attended with fœtid odours, tannin wool turns out to be of great practical service. I had thought that the manufacture of this preparation had become a general fact; but as many medical friends have at various times written for the method, it may be of service to give the details here.

To make tannin wool, add to distilled water heated to 140° Fahr. pure tannin up to saturation, stirring carefully all the time. When the water is saturated, add to it pure cotton wool, bit by bit, until all the solution is taken up by the wool. Lastly, put the saturated wool in an evaporating dish, and dry it slowly until it is quite dry. It is then ready for use, but must always be kept in a closed bottle. It must be neatly teased out before being used; but it is well to keep it in the rough state.

A good stock of tannin wool is at all times a useful thing to keep at hand. It is a ready styptic, and possesses good antiseptic properties. It can easily be iodised by making an ethereal solution of iodine, saturating a portion of the cotton with the solution, and

allowing the ether to evaporate. One grain of iodine to an ounce of the cotton is sufficient to make a very good specimen; and an iodised cotton made in this proportion is one of the best applications for bed-sores that can be adopted. It rarely irritates, it removes odour, and often favours the healing of the sore.

HYDROPS BRONCHIALIS.

HYDROPS BRONCHIALIS is a term I have ventured to introduce, during the past quarter, as a name for the condition of disease described in the ASCLEPIAD for 1884, pp. 253-55, under the head "Condensation of Water in the Bronchial Passages during Narcotism and in Disease."

The general symptoms indicating Hydrops Bronchialis are those of obstruction to the breathing, loud and watery bronchial *rales*, and coldness of the body beginning at the feet and extending upwards until the temperature of the whole of the body is reduced, and the coldness of death becomes universal. As a symptom, coming on late in the course of dangerous diseases or of toxic accidents, it is too often accepted as a mere prelude of death, and is allowed to run its course without attention; but it may often be the turning point to death, the very turning point from life to death. A full description of this condition of disease and of its treatment will be found in my "Clinical Readings and Practices" now running in the *Medical Press*. *Vide Medical Press*, January 25th, 1888.

From his most obedient
and most humble servant
J. Mead.

(Autograph—facsimile—from Presentation Copy to Lady Pembroke
of "Discourse on Pestilential Contagion."—B. W. R.).





RICHARD MEAD, M.D., F.R.S.

IN the year 1662, there lived in the village of Stepney one Mathew Mead, a distinguished Nonconformist divine. He was a man of simple and earnest life and manner, and was one of that band of two thousand Presbyterian ministers, the members of which, sacrificed to the perjury, the weakness, and the thoughtless cruelty of Charles the Second, and to the unconstitutional oppressions of his determined brother, the Duke of York, chose rather to give up their livings and homes, and become outcasts of the world, than do violence to conscience, or be guilty of subservience to iniquity.

The majority of these Nonconformists, brought thus to the touchstone of their faith, were reduced by the "Act of Uniformity" (passed in 1661) to actual beggary. But Mathew Mead had, by good fortune, an ample independent income. The loss of his benefice was of small consideration, and he continued not only to reside at Stepney, but, in the face of the canonical man who had usurped his place, to keep up his ministrations amongst his numerous flock. A stout heart had Mathew Mead, an untiring zeal, a generous soul. Terrible scenes of revenge, deaths by execution, and inconceivable horrors in the name of legality

were at this time being perpetrated, sufficient to frighten even an honest man out of his honesty. It was a period of a grand reaction, from an overstrained and unnatural attempt at supreme saintship, to one of moral anarchy and maniacal dominion of vice.

Mathew Mead bore up against these national calamities. The cross and the glory to him were one; he spoke peace and virtue to his believing friends, declared the simplicity of true faith, stripped the idle ceremonialist of his tinsels, taught the grown man to worship God with the faith of a little child; and by his own purity of life showed, in living example, the truth of the proverb, "Ille honorat Deum optime qui facit mentem suam similem Deo quantum fieri potest."

In these sentences we introduce to the reader the father of the distinguished man whose life-history is now before us, Dr. Richard Mead. It is fortunate, in an historical point of view, that I have in my possession a choice collection of biographical facts regarding our present great man. One work is of immense worth, because what it gives may be fully relied on. It happened that soon after the death of Dr. Mead, one of the writers (name unknown) of the *Journal Britannique* collected from the friends of the deceased many particulars, and therewith put together an authentic history, which was afterwards printed in English as a separate treatise.

Richard Mead, the eleventh child of his family, was born at Stepney on August 11th, 1673, the 13th year of Charles II. It was the proud desire of the excellent Mathew to give his children a good education, and in the fulfilment of this desire his large fortune was freely expended. He had in his house one Mr. John Nesbitt, afterwards an Independent minister, and under his

tuition Richard remained until his tenth year. But now the reverses incident to individual independence, when the unscrupulous are in power, broke up the domestic happiness of the Mead family. In the latter part of the year 1682 the king, guided mainly by his brother, the Duke of York, began to contemplate the exercise of an unlimited power over the corporations of large towns. In 1683 he commenced his usurpations on the Corporation of London, which he at length brought into miserable obedience. This done, other towns followed in the wake, and money was extorted for the royal purse from a host of corporations to secure charters which gave to them no essence of liberty. The English nation, which, not many years before, had rebelled against the First Charles for tyranny of a milder cast, bore these impositions with moderation. The terrors of the last revolution fresh in their minds, they sought peace at any price; and preferred rather to wear for a time the badge of serfdom than buckle on again the Ironside sword, submitting and submitting, because the memoirs of bloodshed among brothers were fresh in their minds, and because, in a division of political parties, there was a common weakness on which despotism could rest itself for a season, and sit commandingly insecure.

But, although the nation at large submitted thus quietly to the Stuart, the year 1683 was not without some shadow of insurrection, and the usual exhibitions of exemplary cruelty. Monmouth, Algernon Sidney, Shaftesbury, Armstrong, Howard, and Russell joined hands in rebellion, though with purposes widely different. The most unworthy of these took part in the Rye House Plot, and the life of the king was saved, as it might be said, by a miracle, if it were not pretty

clear in this, as in most similar instances, that the miracle agreed with its antecedent, the discovery of the plot. The plot detected, arrests and flights were thick as hail. The story need not be told in detail. Russell, whose soul was clear even of the thought of assassination, was fetched from his house to the Tower; to the bar, in the presence of the ruffian Jeffreys; to the block in Lincoln's Inn, in the presence of his weeping countrymen. Sidney met the same fate. Mathew Mead was suspected of having a connexion with the conspirators. Whether the suspicion was true or false is not forthcoming, but it is certain that he thought it his most prudent course to leave his dear country, and, following the instincts of Shaftesbury, to get across to Holland without delay.

The father a voluntary exile, and the family ties for a moment broken, Richard Mead was sent from home, and placed under the tutorship of Mr. Thomas Singleton, another Independent who had suffered from the "Act of Uniformity," by being made to resign for conscience' sake the position of second master of Eton School. Under Mr. Singleton's supervision Richard Mead progressed famously. He was a boy of immense natural powers; his memory was tenacious, his mind buoyant, his love universal, his industry unceasing. He acquired languages with facility, and versified eloquently. He remained with Mr. Singleton six years, and then went to Utrecht, to complete his humanities.

At this time, 1689, there lived at Utrecht a man considered by his compeers as one of the most distinguished professors of history and eloquence of that period. This was Grævius, a man who in early life had been Professor of History at Deventer, but who

was afterwards elected to the same chair in the University of Utrecht, and held it for well-nigh half a century. Grævius died in 1703, leaving behind his famous treatise on the antiquities and history of Italy, Naples, Sicily, Sardinia, Corsica, and the adjoining islands.

Under this teacher, then, Richard Mead commenced his academic career. He carried to the Professor a letter of introduction from his eldest brother, Samuel Mead, speaking greatly in favour of Richard, who was described as a modest youth, already advanced in a knowledge of polite letters.

At the University of Utrecht our scholar remained three years, when, having made up his mind to study and practise medicine, he went to Leyden, where he studied botany under Herman, and the theory and practice of medicine under Archibald Pitcairn in whose house he lived with Boerhaave. It may be easily understood that these students, with tastes so similar and intellects so refined, were not slow in becoming friends. Their hands were soon exchanged in the firm grasp of true fellowship, and the affection that sprang up between them extended throughout their lives.

Pitcairn in his manner was cold, and to few educated under him did he transfer much cordiality. Mead, however, was a remarkable exception; for he, always retiring and at the same time fascinating, worked himself so far into the good graces of the stern professor that the latter not only became communicative, but received from the young student several observations which he afterwards embodied in his writings with all fair acknowledgment. His studies finished, Richard was joined by his eldest brother, Samuel Mead, by a

Mr. Pollbill and Dr. Thomas Pollet, afterwards President of the Royal College of Physicians, and the four commenced their travels. They went to Italy first, where, says his biographer, Mead met with everything that could gratify his exact and refined taste for all that is great and beautiful. At Florence he had the curiosity to inquire for the *Tabula Isiaca*; but not being able to get any information about it, he desired leave to search for it in a lumber-room over the gallery. There he found this valuable piece of antiquity, buried in dust and rubbish, where it had been carelessly thrown, and during many years given up for lost.

In this year, 1695, on August 16th, Mr. Mead was transformed into Dr. Mead, by taking at the University of Padua his degree of Doctor of Philosophy and Physico. Some time after this he went to Naples, and later to Rome, remained there a brief period, and, finally returning to his birthplace, settled down in practice in the house in which he was born, about the middle of the year 1696. He continued to practise in Stepney with great success until 1703, when, on being appointed physician to St. Thomas's Hospital, on May 5th of that year he removed to town, and took a house in Crutched Friars.

Prior to this he had gained a distinguished reputation, and many interesting events had occurred. In July 1699 he married Ruth Marsh, the daughter of a London merchant. In the same year, on October 16th, brave Mathew Mead, the father, who had returned from his exile and renewed his ministerial labours among the Nonconformists, died.

In 1702 Dr. Mead brought out his first literary work, entitled "A Mechanical Account of Poisons," and shortly afterwards he prepared for the Royal Society an

account of Dr. Bonomo's discoveries on the cutaneous worms which generate itch. This research led to his election as a Fellow of the Society, and gained for him the friendship of the greatest President that ever held office there, Sir Isaac Newton.

The work called the "Mechanical Account of Poisons" was published as a distinct treatise, but its author had already his admirers, one of whom, Mr. Samuel Morland, presented an analysis of it to the Royal Society, which analysis is printed in the twenty-third volume of the Transactions. The work itself consists of four essays. The first essay refers to the viper and its poison, and in it Mead settled for good a very important point, viz., that the viper emits a veritable poison with its bite. On this subject a warm contest had for some time been carried on. Rhedi believed in a veritable poison; Charas espoused a notion, held by Van Helmont, that the effects of the bite arose from the "enraged spirits of the animal, and that the yellow liquor was a pure and innocent saliva." Mead supported Rhedi. The experiments conducted by him in this inquiry were simple, but bold and effective. He made vipers, when enraged, bite hard substances; he collected the fluid emitted, he inoculated other animals with the fluid, and produced the specific symptoms. The viper, he says, conveys its mischief by the yellow liquor which it emits into the wound through a slit near the extremity of the tooth.

At this time the microscope was in great repute among natural historians. It was a novel instrument in those days, but as popular as it is now. Our experimenter, therefore, must needs examine viper poison with this instrument. By this means he discovered the juice "to be full of little floating salts,

which in a short time shot out themselves into crystals of an incredible tenuity and sharpness," and which he defined in the subjoined sketch. On this discovery he based a peculiar theory as to the action of this poison on animals inoculated with it. As the blood contains little floating globules in immense numbers, he conjectured that the pointed salts present in the poison, upon being introduced into the blood, prick the globules, which being thus emptied of their contents adhere, and being attracted in a manner different to what they were before, the texture of the remaining blood is broken.



The hypothesis of Mead was tinged with the mechanical views of his time, but his facts were most valuable. He proved the existence of a poison, and showed, by tasting it, that it was only poisonous when introduced by inoculation, thus proving the words of the poet:—

“Noxia serpentem est admisto sanguine pestis,
Morsu virus habent, et fatum dente minantur,
Pocula morte carent.”—*Lucan, Phars.*, IX. 614.

“We resolved,” he says, “to end our inquiries by tasting the venomous liquor. Accordingly, having diluted a quantity of it with a very little warm water, several of us ventured to put some of it upon the tip of our tongues. We all agreed that it tasted very sharp and fiery, as if the tongue had been struck through with something scalding or burning. This sensation went not off in one or two hours and one gentleman,

who would not be satisfied without trying a large drop undiluted, found his tongue swelled with a little inflammation, and the soreness lasted two days. But neither his nor our boldness was attended with any ill consequence."

At the end of his book he engraved, from an antique statue, a representation of a child holding out by the neck, in graceful figure, an enraged serpent, with this device: "*Labor est Anguis superare.*"

As a remedy for these poisonous bites, Mead refers to the actual cautery, the *axungia viperina*, and viper's flesh; he concludes the essay by an account of some other poisonous animals, as the spider (in which he claims to have discovered the instrument conveying the poison), the scolopendra, and the scorpion.

The next essay relates to the tarantula and the mad dog. The remedy for a person bitten by the tarantula is said to be music, upon hearing which the patient often rises up and dances till he sweats out the malady. The third essay, which includes the consideration of arsenic, corrosive sublimate, various poisonous plants, and opium, is vague in its conjectures. The attempt is made to base every explanation on mechanical principles. Corrosive sublimate is made up of saline crystals and mercury. The globules of mercury sublime, and lodge themselves in the pores and interstices of the saline crystals. The crystals are so many sharp blades, made more irresistible by the weight of the mercurial globules. Hence, in the stomach, these weighted particles corrode the parts. He mentions one curious historical fact regarding arsenic, viz., that this substance in time of plague was sometimes worn at the pit of the stomach as an amulet. This custom, he conjectures, had its origin in a mistake. "Perhaps some of the

Arabian physicians had commended Darsini worn in a bag for a preservative in plague time. This, in their language, signifies cinnamon: but the Latin translators, retaining the same word in their translations as was frequently done, one or other afterward not understanding its meaning, substituted in its place *de arsenico*, as as if Darsini were all one with Zarnich."

The fourth essay is on venomous steams and damp, and is a very curious and interesting document. Here Mead describes his visit to the Grotto del Cane, and explains that the miasm there only rises to a certain height from the earth. But, again, he gets into mechanical argument, enters at great length into the mechanism of respiration, and rides his hobby till it has not a leg to stand upon.

Mead, installed in London, and made Physician to St. Thomas's Hospital, was soon a rising man. About the year 1704 he was elected on the Council of the Royal Society, an honour which was again bestowed in 1707. The changes in political affairs had all been in favour of the son of a Nonconformist. In the year 1707 the University of Oxford conferred on him the degree of Doctor of Physic, by a diploma dated the 4th of December. He continued his labours, practical and scientific, with unabated activity, and secured to himself the friendship and esteem of a large circle of learned and estimable friends.

About this time his labours were directed to the consideration of the influence of the sun and moon on animal bodies, labours which he made known to the scientific world in 1708, in a separate discourse.

The discourse is, perhaps, the most ingenious of all Mead's papers. As a medical document it may be of little value, but as a philosophical treatise it is at

once original and far-seeing. There is no doubt but that he was spurred on to the undertaking of this work by his friend Sir Isaac Newton. Not long before, Newton had brought forth some of his grand deductions regarding the tides. It was Mead's idea, and he made it the basis of his argument, that "as the sea is, so must be the air." Following out this argument in favour of ærial tides as dependent on the influence of the sun and the moon, he showed that "the motion upwards of the air will be strongest of all about the equinoxes." Thus, applying in full to the atmosphere what Sir Isaac Newton had demonstrated in reference to the sea, Mead carried out his calculations with care and precision, and came finally to the grand conclusion, not only that the tides of the air are much greater than those of the ocean, "*but that these motions must both be universal, and also return at certain intervals.*"

Passing from the general or purely philosophical part of his discourse, Mead enters on the professional part of his subject. He connects in a loose manner epilepsy, vertigo, hysteria, palsy, hæmoptisis, and menstruation with lunar influences, and relates stories in which he has faith, but which we in these perverse days should send to the coast, for the bird tribe thereabout. "Kirckringius," says he, "knew a young gentlewoman, whose beauty depended upon the lunar force; insomuch that at full-moon she was young and handsome, but in the decrease of the planet so wan and ill-favoured that she was ashamed to go abroad till the return of the new moon gave fulness to her face and attraction to her charms."

Mead believed in the crises of diseases of the epidemic class, and with his definition of a crisis no modern one need quarrel: "A crisis is no more than the expulsion of morbid matter out of the body, through some or

other of the secretory organs." But when he gets absorbed in his connections of this principle with lunar motion, the mist falls, and we are left in thick night. It is curious at the same time, in these wanderings of his, to trace out every here and there the origin of some popular idea which still holds place. Here is one example:—In many parts of England the poor, to this day, have a common notion that death takes place most frequently with the ebb of the tide. Whoever may practise medicine for a few months by the side of the Thames will soon become familiar with the question, "D'ye think he'll go off by turn of tide?" By-and-bye too the practitioner will become so accustomed to the old query, that he will connect it more or less with the fact as it really occurs. The coincidence is indeed common, and the people have faith in it. With the true genius for observation, Dickens has got hold of this popular feeling, and makes Mr. Barkis go out with the waves into the great ocean of death. The man of science looks on this now as a fanciful hypothesis, but it once held such different place in human reverence, that our author, Dr. Mead, accepted it, and a Royal Society man, Paschal, took upon himself to explain it.

In the "Transactions of the Royal Society" for 1708-9, there is a paper from Dr. Mead on three cases of Hydrophobia. There is nothing special in these cases except that in one the patient could not tolerate the appearance of anything white; and that in the dissections of two of these patients the operating anatomists pricked their fingers, and suffered from the effects of a poisoned wound, but recovered, showing no specific signs of the disease. An important observation this, though accidentally made.

Mead's pathological views on Hydrophobia were as

follows :—"It is the effect of a particular kind of an inflammation in the blood, accompanied with so great a tension and dryness of the nervous membranes, and such an elasticity and force of the fluid with which they are filled, that the most common representations are made to the mind with too great effect, and the usual impressions of objects upon the organs cannot be suffered; hence proceed the timorousness, unaccountable anxiety and inquietude, which are always the forerunners of the dread of liquids." The cause of deaths in such cases, Mead thought, is an exhaustion, due to the violence of the actions and efforts of the sufferer. The barking symptom sometimes met with was observed by him, and was attributed to attempts to cough up mucus from the trachea. In one of his cases there was constant priapism, a symptom noticed by Cælius Aurelianus. In another of the cases the symptoms did not appear until three months after the bite, a fox that had been bitten by a dog being the animal that bit the man.

In 1711 Mead moved from his house in Crutched Friars to a house in Austin Friars, which had been previously tenanted by Dr. Howe, then deceased; and he was appointed to read the anatomical lectures at Surgeons' Hall, which office he filled with great success, and continued in it for seven years. He had also the favour of the distinguished Radcliffe, who assisted him in his career, and to whose great position he ultimately succeeded.

He had plenty on his hands now,—hospital visits, lectures, a new house, several children, an increasing practice, an extensive circle of friends, and the MS. of a new inquiry on his study table for filling up leisure chinks. A very busy time this in any man's life, yet

a happy time too, the only happy time, if the man himself be by nature industrious, anxious, earnest, restless,—like all men upon whom is placed the press-mark “First men.” To such, starvation of mind is a more serious penalty than starvation of body; they must do or die.

Hogarth, whose work will be seen in the sketch opposite, has made poor Mead take the dignified position of a militia drill-sergeant.*

The author of the amusing book called the “Gold-headed Cane” tells us with great unction about the illness of Queen Anne, and about Mead being called in to consult with Arbuthnott and his colleagues. We cannot accept all that this imaginative writer says, but it seems from other testimony that Mead’s presentment of danger was keen, and that, at his instigation, an account of Her Majesty’s dangerous symptoms was sent to Hanover, as preparing the way for the departure of the first George for the kingship of England. This statement must not be received, however, as telling against Arbuthnott, to whom, notwithstanding the high intelligence of Mead, the fair critic must award the first position as a man of intellect and genius. It is sufficient to know, that no variance of a personal kind ever existed between the two; they knew, understood, and respected each other, though Arbuthnott lost place, and Mead took up his court garment of favour. Radcliffe, it would seem, was first summoned to the consultation, but was ill with gout at Carshalton, and could not attend. Within three months after this event, viz., on November 1st, 1714, Radcliffe himself shuffled off existence; and Mead, who had succeeded

* For a copy of this unique drawing I was indebted to the late Mr. Squibb.



SKETCH BY HOGARTH OF RICHARD MEAD, M.D., F.R.S.,
AS A MILITIA DRILL SERGEANT.

(From a drawing in the possession of the late Mr. Squibb.)

already to much of his practice,* now succeeded also to his house in Bloomsbury.

The distance of this house from St. Thomas's Hospital caused Mead to give up his appointment as physician to that institution on January 5th, 1716. The Committee returned their thanks, and honoured him with a governor's staff. On March 17th of this same year Bishop Burnet died, and Mead, Cheyne, and Sir Hans Sloane met in consultation in his case.

About this time Mead was engaged on an inquiry into the value of purgatives in the treatment of small-pox, as preventive of the seven-day fever. He seems to have thought he had made a valuable point in this treatment, but he did not publish any distinct work on the subject until many years afterwards. Meantime, however, he had communicated his ideas to Friend and Radcliffe, and in 1717 Friend, in a commentary on the first and third books of Hippocrates, published a letter on the above-named treatment, which he had received from Mead seven years before. Hereupon Dr. Woodward, whom we have met already in the Arbuthnott memoirs, published a book in opposition, called "The State of Physic and Diseases, with an Inquiry into the Causes of the late Increase of them, but more particularly of the Small-pox." A literary battle followed, and much ill-feeling, which Mead did not forgive nor forget.

In 1717 Sir Isaac Newton gave to Mead the office of Vice-President of the Royal Society. Two years later Mrs. Mead died, leaving four out of eight children, three daughters and one son, Richard by name. In the same year the then Secretary of State, Mr. Craggs,

* Radcliffe was elected M.P. for Buckingham in 1718, and at that time, virtually, had resigned practice.

gave to Mead a commission to make an inquiry into the best mode of stopping the progress of Plague, which disease was at that time prevalent at Marseilles. The result was the publication by Mead of his famous treatise, "A Short Discourse on Pestilential Contagion, and the Methods to be used to prevent it." The discourse was dedicated to Mr. Secretary Craggs, with the usual honours. It went through eight editions in three years, and although it did Mead honour as a medical work, it was said to be injurious to him socially, since it was thought to have a political meaning, and that in the recommendations so strongly urged by him for a strict quarantine, and for lazaretto lines of circumvallation, an intention was supplied for the erection of barracks and the support of a standing army at home. In time the fallacy of this popular rumour died away, and the honesty of the man was as fully recognized as before. The work on the Plague went through seven editions in one year, its author presenting copies of it to his more particular friends only. My own beloved friend the late Dr. Francis Webb, F.S.A., possessed one of these handsomely-bound presentation copies. It was sent to the "noble Lady Pembroke," and bears on its first page, or rather fly-sheet, a compliment in the handwriting of Mead, the last two lines of which with the autograph are printed on the portrait accompanying this memoir.

In this work Mead expressed himself strongly in favour of the contagion theory, and having announced this dogma, his preservative measures were based upon it. Quarantine long—Quarantine strong—was the burthen of his argument. As to a specific remedy for the Plague, he opines that this is no more to be hoped for than is a specific preservative for the small-pox.

On the 9th April, 1716, Mead was admitted as a Fellow of the Royal College of Physicians, and acted as Censor until 1724. In 1717 he was elected (October 6th) Fellow of the Royal College of Physicians of Edinburgh. In 1721 (at the command of the Prince of Wales) he made the famous experiment of inoculating some condemned criminals for the small-pox. On six of the prisoners he tried the ordinary method, on the seventh he carried out the Chinese plan, slightly modified; by introducing into the nostrils a pledget wetted with matter taken from a ripe pustule. This succeeded. All the criminals contracted small-pox, except one, who had had the disease previously. They all recovered and saved their lives; going out of prison even safer than when they went in. The success attendant on this trial being thus declared, the two young princesses, Amelia and Caroline, were inoculated on April 17th, 1722. Both had the disease favourably; and so, unhappily, the practice, first introduced by Lady Mary Wortley Montagu, became so universal that England was made a common pest-house of this disease.

The notorious "Atterbury plot," as it has been called, occurred in 1722, and Friend, whose valour overcame his discretion, being then M.P. for Launceston, made himself so conspicuously opposed to the Government, that he was cast into prison on suspicion of being in the plot, and was there confined for many months. Mead took, meantime, the greater part of his practice, and used his best efforts for the liberation of his friend. He was allowed to visit the prisoner, and "Gold-headed Cane" dwells on one of these interviews, in which they discovered Friend writing a letter to his visitor. Friend stated that his time did not pass unpleasantly, as he was busy writing his History of Physic. "Gold-headed

Cane" further tells us that Mead secured the liberation of Friend, as follows:—

"When Sir Robert Walpole, the minister of the day, sent to consult Mead on account of an indisposition, he availed himself of the occasion to plead the cause of the captive. He urged that though the warmth and freedom of Friend might have betrayed him into some intemperate observations, yet no one could doubt his patriotic feelings and loyalty. Finally, the doctor refused to prescribe for the minister unless the prisoner was set at liberty. He was almost immediately relieved from prison and admitted to bail, his sureties being Dr. Mead, Dr. Hulse, Dr. Levet, and Dr. Hale." The evening after this event, continues the "Cane," "there was a numerous assembly at our house at Great Ormond Street, attracted by the hope of seeing Friend. He came, and every one was delighted to meet him once more. When the party broke up, Friend and Arbuthnott were about to take their leave together, as they lived in the same part of the town—the former in Albemarle Street, the latter in Cork Street. Dr. Mead, however, begged Friend to step with him into his own private study, which was a small room adjoining the library. There he presented him with the sum of five thousand guineas, which he had received from his patients whom he had visited during his confinement. On returning to the great room, he wished them both 'good night,' and jocosely said to Arbuthnott (who happened to hold the office of Censor to the College that year), 'Now I commit our common friend here to your magisterial care and guidance; see that he does not again get into trouble; and on the least appearance of irregularity report him to the President, Sir Hans Sloane. I look to you, Arbuthnott, to preserve harmony amongst us.'"

In 1723 (October 18th) it fell to the lot of Mead to deliver the Harveian Oration at the College of Physicians. This oration was severely criticised by Dr. Middleton, the point in dispute being whether the Physicians of old Rome were or were not slaves? Mead said, No; Middleton said, Yes. The argument ran high, when Professor Ward came in to the rescue of Mead, and gave the victory to him. It is creditable to Middleton that, despite this learned fight, he retained his unabated regard for his antagonist.

The curtain rising after another year discovers Mead a second time taking to himself a wife. On August 14th, 1724, he married Anne, daughter of Sir Rowland Alston, of Odell, Baronet. The second Mrs. Mead outlived her husband, but had no children.

The "Gold-headed Cane" tells with minuteness the history of the last illness of the great Sir Isaac Newton:—"In 1726, early in the month of March, Mr. Conduit called upon my master, and carried him, together with Mr. Cheselden, to Kensington, where Sir Isaac had taken a house for the benefit of his health. On our first interview, it was pronounced that the illness of Sir Isaac arose from stone in the bladder, and no hopes were given of his recovery. We found him suffering great pain; but, though the drops of sweat ran down from his face with anguish, he never complained or cried out, or showed the least signs of peevishness or impatience. On Saturday, the 10th of March, he read the newspapers, and held a pretty long discourse with Dr. Mead, and had all his senses perfect. But at six o'clock on that evening he became insensible, remained so during the whole of Sunday, and died on Monday, the 20th, between one and two o'clock in the morning."

In 1727, on the accession of the Second George, Mead was appointed First Physician to His Majesty. His success at this time was without parallel. He was consulted by all persons of consequence, and his doors were constantly thronged with the poor, to whom he not only gave his advice free of cost, but commonly added to it pecuniary assistance. His house was one great museum and treasury of learning and science. For a foreigner to come to London and not visit Mead was to omit one of the lion treats. He was accessible and courteous to every one. If an artist or writer, or ingenious man of any sort, were needy and in need, Mead was his refuge. A marble bust of Harvey, which he presented to the College of Physicians, from an original picture, was done by an artist under his patronage. He studied how to make remunerative work for the employment of others, and the study was to him a delight. If any benevolent man, with money in hand, wanted to expend it in charity, Mead pushed the matter home, and pointed the way. If an invention or experiment had to be tried, Mead must, of course, be invited to see it. If a valuable book, piece of art, or aught else of scientific, learned, or antiquarian lore, were brought to London, the chances were ten to one that Mead's museum or library would become the storehouse. His time was incessantly occupied; but the variety of occupation, and the simplicity of his habits, rendered his labours a pleasure and his life a constant enjoyment. "With respect to his manner of living," says the Gold-headed chronicler, "when not engaged at home, he generally spent his evenings at Button's coffee-house; and in the forenoons apothecaries used to come to him at Tom's, near Covent Garden, with written or verbal reports of cases, for which he

prescribed without seeing the patient, and took half-guinea fees."

The history of Thuanus was brought out in full in this country through the liberal exertions of Dr. Mead. A Mr. Carte, who had been accused of high treason, and who had fled to Paris for safety, employed his time in collecting materials for an English translation of Thuanus. Mead hearing of this enlarged the design, and, having paid Carte for what he had already done, appointed Mr. Buckley to edit the work. Thus, under Mead's patronage, a perfect edition of the work was brought out, including three letters from Buckley to the Doctor explaining the character of the history, and the plan of the new edition. These letters were done into Latin by Professor Ward, and were placed in the front of the work, which was published in 1733 in seven folio volumes. In like manner he printed for private circulation Dr. Thomas Burnet's "*De Statu Mortuorum et Resurgentium*."

We pass over a long series of years, during which we can follow the daily course of Dr. Mead imaginatively only, except to record that in 1735 he wrote a paper, not to the conviction of Boerhaave, recommending the use of a mixture of the Lichen Cinereus Terrestris and Pepper as a specific for hydrophobia, under the name of Pulvis Antilyssus; and that in the following year he, as joint executor with Lord Chief Justice Reeves of the will of Thomas Topham, Esq., bestowed on Eton College that gentleman's books and drawings. We may be assured that at this time he was not idle, for his librarian, Mr. Hocker, tells his *Britannique* biographer that in one year his master made £7,000, and for several years between £5,000 and £6,000. He was, however, too liberal to hoard up his fortunes. His table was at

all times surrounded by friends and acquaintances, and he even had a second table, to which persons of an inferior position were welcome. Nor did he make all that he might have done by his practice, for of men of learning he would never take a fee. Bowyer, the printer and scholar, always, he tells us, consulted Mead, but was never allowed to pay for the advice. The same beneficence was extended to the clergy, from whom he was never known to accept money but on one occasion. The anecdote is related by Bowyer, and is authentic.

A Rev. Mr. Lake, fellow of St. John's College, Cambridge, was a nervous, excitable, dyspeptic man. He doctored himself by the rules and prescriptions of Cheyne. Becoming reduced by attending too strictly to Cheyne's prescribed regimen, or not understanding the matter sufficiently well, the invalid got worse, and at last came to London to consult Dr. Mead. In the presence of the great man, the patient gave him in detail all the plans he had followed in accordance with Cheyne's advice, as laid down in books. Mead, says Bowyer, "a proud man and passionate, damned Cheyne and his regimen. 'Follow my prescriptions,' said he, 'and I will set you up again.' But this was a disobedient, or, to use a common term, a crotchety patient, who would not go on without still dabbling in Cheyne. Might he follow such and such a rule of his golden author? was his constant query to the exasperated prescriber. At last the invalid, much improved, was about to leave, and, therefore, like an honest man and proper, asked his doctor what he was indebted to him. 'Ten guineas,' replied Mead; 'for though I have never before taken a fee of a clergyman you must not complain of being an exception, because you choose to prescribe to me, instead of following out my rules, and trusting

to the advice you sought from me.' With this he received the money, but told the patient he might call upon him once more, upon which occasion he returned six of the guineas."

The extended friendships which Mead made were all of the firmest kind: Cheselden, Garth, Arbuthnott, Pope, Newton, Halley, Burnet, Watson, Boerhaave, Pitcairn, Swift, and Sir Hans Sloane—these and others, little less illustrious, were his friends and scientific allies. Did any man ever before or since form the centre of such an immortal circle of genius, industry, and knowledge?

The only man almost with whom he was at variance was Woodward, the naturalist and doctor. Woodward was unfortunate generally in his friendships, for the reader will remember that between him and Arbuthnott no love was lost. Why this dislike is rather difficult to say, for Woodward was an able man and independent. Master Wadd, gossipier in general on things medical, gives an anecdote about Mead and Woodward which will bear recital.

In the prints of Ward's *Lives of the Gresham Professors* is a view of Gresham Gateway, entering from the Broad Street, and marked No. 25. Within the gateway are two figures, one standing the other kneeling. These are Dr. Mead and Dr. Woodward. Woodward had done something professionally which offended Mead; Mead, therefore, meeting him in this place, when returning to his rooms in the college, drew, as did his adversary. In the combat Mead got fairly the advantage, and commanded poor Woodward to beg for his life. Woodward's answer was couched in excellent wit. "*No, Doctor, that I will not, till I am your patient.*" But Mead was inflexible, Woodward had

to submit, and the picture represents him in the act of yielding up his sword.

The generosity of Mead was not confined to the scenes of his own home. It is a just tribute to him to say, that but for his energy and assistance the Foundling Hospital would in all possibility have never been erected. To this great institution he was one of the first contributors; and Captain Coram, the founder, was urged on to his work by the arguments of his Esculapian friend.

"In like manner," says his *Britannique* historian * "he persuaded Guy, the wealthy citizen, to lay out his immense fortune in building a new hospital for the reception and maintenance of the wretched and indigent who are discharged out of all others as incurable." After the death of the first president of Guy's the office was offered to Mead, who declined it on the grounds, it has been presumed, that in his opinion the intentions of the founder had not been carried out by the managers.

"Gold-headed Cane," who, like myself, begs hard from the *Britannique* gentleman, tells us that in 1746 he accompanied Mead to the house of Mr., afterwards Sir, William Watson, in Aldersgate Street, to witness some experiments in electricity. A Leyden jar, then a new invention, was produced, and the Duke of Cumberland, recently returned from Scotland, took a shock from the point of the sword with which he had fought the battle of Culloden. "Two years after," continues the same authority, "we witnessed the famous experiments made on the Thames and at Shooter's

* Hutchinson, in his "*Biographica Medica*," takes every word he has to say about Mead from this writer, except the story about Lake, which he has from Bowyer. He acknowledges neither author.

Hill, in the presence of the President and several of the Fellows of the Royal Society ; in one of which the electrical circuit was made to extend four miles, and the result of the experiment was, that the velocity of electricity seemed to be instantaneous."

As illustrating the attention which Mead was accustomed to show to every useful invention, we may refer to his exertions in behalf of Mr. Sutton, a gentleman who invented a new mode of ventilation. A history of this is given in Mead's works, together with a preface from him, and a short treatise on Scurvy. Mr. Sutton's plan of ventilation was proposed for ships chiefly, and was formed on the principle, "that a fire being always kept on board a ship, and a pipe or cavity made to the well, one end of it being heated by fire, a change of air would follow, and by this means be rendered sweet and pure, and fit for respiration."

In a dilemma with the naval authorities, Sutton applied to Dr. Mead. He went direct to the Doctor's house, where he met Martin Folkes, President of the Royal Society. Both Mead and the President expressed their approbation, and the former soon after waited on the Lords of the Admiralty, and represented to them the great importance of the matter, whereupon they ordered that it should be tried on any of His Majesty's ships in the river.

After endless annoyances the experiment was prepared on a hulk at Deptford, in September 1741. Mead went there with Martin Folkes and the Lords. Sir Jacob Ackworth was there, doing the official, and was pleased to say that he was sorry they came so far to see so foolish an experiment ; that he had himself tried it yesterday, and it would not shake a candle. The experiment, in spite of this, succeeded, and the *Norwich*

man-of-war was fitted up under Mr. Sutton's supervision. But soon there came in a new ministry, and the inventor was again thrown out of patronage, receiving for all his trouble and time only £100. The Rev. Dr. Hales' ventilating bellows obtained the ascendancy.

On February 11th, 1741-2, Dr. Mead brought Sutton's invention before the notice of the Royal Society. On April the 1st Mr. Watson sent another paper to the Society on the same subject, and after many years letters patent were obtained, authorising the general application of the scheme to the whole navy. A copper model of Sutton's plan of ventilation was deposited by Dr. Mead in the Museum of the Royal Society. The plan fell, ultimately, into disuse.

A discourse by Mead on "Scurvy" is an interesting paper, giving the pathology of the disease, and the treatment by the use of vegetable acids. Some curious anecdotes are here and there supplied to illustrate various points. He records a conversation with Lord Anson, the famous voyager, with whom he seems to have been on very friendly terms.

In the year 1747 Mead brought out his treatise on Small-pox and Measles, and announced for the first time in a special work his views as to the treatment of the former disease. A considerable part of the work he wrote many years before. He says that, in 1708, he observed that many of the patients in St. Thomas's Hospital, suffering from a malignant small-pox, were saved, beyond expectation, by a looseness seizing them on the ninth or tenth day of the disease, and sometimes earlier. This led him to try the effect of administering laxatives in the decline of the disorder; and finding the plan succeed he adopted it, and was supported in his views and practice by Friend, who lost

caste for his pains, and was obliged to defend himself warmly.

It has been already said that Woodward originally entered into a dispute on this question. Mead never forgave this offence, but twenty years after the death of his opponent, *i.e.*, in the preface of the book now before us, gave vent in pitiless terms to his pent-up indignation, being absurdly indignant because poor Woodward was originally a linen-draper.

To the treatise on the Small-pox Mead added a translation of Rhazes' treatise; the Arabic copy he obtained from his "good friend the celebrated Dr. Boerhaave," of Leyden; but as it proved to be full of faults, he employed Solomon Negri, a native of Damascus, and John Gagnier, Arabic reader at Oxford, to turn the treatise into Latin. These gentlemen did the work with diligence, and as the two versions differed, Dr. Thomas Hunt, Arabic Professor in the University of Oxford, compared the two Latin versions with the original, and out of them, in Mead's presence, made and arranged the translation.

A difference of opinion existed between Mead and Boerhaave in regard to small-pox. Mead did not, on his part, believe in the cure of the disease without suppuration. Boerhaave would not accept the purgative treatment.

As his declining years released him from medical fatigues, Mead devoted his time to the writing of the "*Medica Sacra*,"—a strange production, including chapters on the disease of Job; the leprosy, the disease of Saul, Jeroboam, and Hezekiah; the disease of old age; the disease of Nebuchadnezzar; the palsy; demoniacs, and such like subjects.

His last work was "The Medical Precepts and

Cautions," a series of instructions selected without order from his loose papers ; in this work the physician is himself again. Apoplexy, madness, pleurisy, fever, and many other cases are here discussed with much care and common sense ; but the time has gone by for their application to practice. Now and then he relates a curious fact ; as, for instance, the treatment of Dame Mary Page, who died in his time. Her monument, he says, "is still in Bunhill Fields, and on it is inscribed, by the patient's own request, the following" :—

" Here lies Dame Mary Page,
Relict of Sir Gregory Page, Bart.
She departed this life March 2, 1728.
In 67 months she was tapped 66 times :
Had taken away 240 gallons of water,
Without ever repining at her case,
Or ever fearing the operation."

Mead speculates as to where the water came from, and thinks it must have been from the ovaries. He was the first to recommend firm pressure on the body after the tapping operation.

In various passages written at this period, Dr. Mead took occasion to revise and comment on many of his former views and opinions. The dread of inconsistency, which Emerson tells us is the hobgoblin of weak minds, haunted him not. He dared to examine, and explain, and retract his own earlier views.

Three years before death he became very corpulent, and his faculties failed him ; but his geniality and love for his fellow-men remained ever unchanged.

Death caught Mead on Saturday, February 16th, 1754, he being then in his eighty-first year. He sank placidly into the unknown, after a few days of painless illness.

He was buried on the 23rd in the Temple Church, near his brother Samuel, counsellor-at-law, and a monument was there erected to his memory. Afterwards his son Richard (who, by the way, had a legacy of £800 left him by Lord Chief Justice Reeves) erected to his memory an honorary tomb in the north aisle of Westminster Abbey. The tomb bears an elegant inscription by Professor Ward, and is surmounted by an admirably carved bust.

Mead did not die rich, £20,000 being all that was left from him ; but his family were well cared for. His second daughter married Charles Bertie, Esq. ; his eldest, Dr. Edward Wilmot ; and his youngest, Dr. Frank Nichols. These last-named gentlemen were Physicians-in-Ordinary to the King.

A marble bust of Mead was taken by Roubillac, and was presented afterwards to the Royal College of Physicians by Dr. Askew ; a portrait of him was etched by Pond ; another by Richardson ; a mezzotint was taken by Houston from a portrait by Ramsay ; and a medal of him was struck long after his death by Lewis Pingo.

The house in Great Ormond Street which Mead occupied is now the Hospital for Children. At his death the vast treasures this house contained, its library of 6,592 volumes, its statues, pictures, and antiquities, were sold by auction, and dispersed to the four quarters. Many of his pictures brought immense sums of money.

Of our illustrious Esculapian dead, no man in his day had so great and universal a celebrity as Mead. Indeed, there is possibly, in our biographical literature, but one other who gained in his lifetime so general a reputation. Boerhaave, his contemporary,

fellow-student, and beloved friend, is the exception; and even he, despite the story that a dweller in the celestial empire of China wrote him a letter, addressed *Dr. Boerhaave, Europe*, did not achieve a greater renown. The King of Naples wrote to Mead, requesting a complete collection of his writings; and in recompense forwarded to him the first volumes of Signor Bajardi's work on Antiquities, and invited him to his own palace, an invitation which was only unhappy in that it came too late. "The scarce and perhaps the only copy of Servetus' last book," says the *Britannique* writer, "passed from the shelves of our English worthy to those of his friend," M. de Boze. When the government wished for information on medical matters they sought out Mead, and when the colonies or the counties wished for physicians, they left the choice of such safely to his care. Young men going forth under his patronage met with the kindest attention; he asked only, in return, for a note of their observations and doings; while to every good thing they did he accorded every honour. A Whig in politics, he was too liberal to let political rancour efface merit or destroy friendship.

Filled with a true ambition, he courted but such notoriety as was honourable, and possessed the courage to decline the Presidency of the College of Physicians, when, by his enfeebled age, he was admonished that the trust were better left in younger and more active hands. Such were the mental traits of Richard Mead, and by these, rather than by any great profundity of intellect, he prospered. He had neither the brilliancy of Arbuthnot, the practical shrewdness of Wiseman, nor the genius of Harvey; but his classical learning was greater than theirs, and at his crowded banquets he often was the only man that

could hold converse with the visitors from the various nations who flocked around his table. His strength lay not in original thought, but in an ability of appreciating what was original in others; not in imagination, but in memory; not in keen, all-seeing, over-seeing perception, but in calm, careful, industrious observation. Men of this class are rare, but when they are, they are the commanders of their time. They are the ballast of science. To them even greater men show respect; and if they embellish the age in which they live by no splendid triumphs or outpourings of genius, they give to it a tone and a solidity which preserves it in history as an age of progress without rant, and of knowledge without cant. Richard Mead was one of these common-sense ballast-men, and in his time and in his vocation he played his part second to none. His chosen motto was his life's precept—*Non sibi, sed toti.*

*A HISTORY OF SOME ORIGINAL RE-
SEARCHES IN THERAPEUTICS.*

UNDER the above title I propose to render a short account of some of my more important original researches in therapeutics.

At labours connected with this branch of medicine I have been engaged from the very first days of my medical career, and down to the present more advanced day these have never ceased. Up to this time, however, all that has been done has been published in so disconnected a form, and spread over so many different journals, I have had quite a task in making a collection for republication in a condensed form. The late distinguished Professor Silliman of New York was once good enough to collect, in a small but compact book, many of my therapeutical essays, a distinction I shall never forget; but that work is, I believe, now out of print, and if it were not, it stopped short at too early a period to be representative to the latest phase.

The researches to be now recorded are all based on one foundation. The object of them has been to bring the art of prescribing medicinal remedies to a positive position. I very soon learned, in practice, that in prescribing medicines there were a few which were reliable beyond all doubt in respect to their

action, for good or for evil. Epsom salts purge; opium puts to sleep; tannin astringes; ether relaxes muscle and muscular spasm; potassium iodide specifically cures certain easily diagnosable forms of syphilitic disease; and acetate of ammonia produces free diaphoresis. These and a few other undeniable facts were clearly seen, but they were quickly obscured by other facts which made, to my mind, all dogmatism in regard to treatment absolutely impossible. Surrounded with doubts, I began to experiment. The new science and art of anæsthesia opened up paths of promise. In using anæsthetic agents I began to tread on safe ground. The narcotic gases and vapours obeyed fixed laws: they were seen to act according to their physical qualities, and according to their chemical composition. In time I could state whether or not a chemical body, put into my hands, were or were not an anæsthetic, by merely knowing its composition and the precise nature of its physical characteristics. I could predict from the same knowledge the kind of anæsthesia a substance would produce, the depth of action, and the period of recovery. Step by step I was led on from one substance to another, following always the same method, though not always with the same success.

The original plan I laid out for myself was to test the action, on the bodies of living animals, of all the available *elements*; namely, oxygen, hydrogen, nitrogen, chlorine, carbon, iron, mercury, lead, zinc, and so on through the series. I began with oxygen, and the researches on that element which have been recorded in past numbers of the ASCLEPIAD are a part of these early attempts to essay an advance on such truly elementary lines.

From the elements I proposed to move to the binary
VOL. V.

compounds; oxygen with hydrogen, as hydrogen peroxide; oxygen with carbon, as carbon oxide; and so on to more complex compounds.

From the first in these researches I determined on a settled plan, with which, to this day, I remain satisfied; except that I have added to the original design one or two new points which have suggested themselves or have been suggested in the course of general advance of therapeutical inquiry.

The heads of observations stood as follows:—

1. The specific action of each chemical element forming part of a proposed medicinal substance.

2. The modification of action produced by combination of elements, beginning with simple binary combinations, and proceeding to the more complex.

3. The influence of the physical state of the agent, gaseous, fluid, or solid, on its action.

4. The modification of action caused by the animal body itself, in different types of animals, and especially in regard to animals of different temperatures.

5. The action of the agent under observation on the circulation of the blood; and particularly on the minute circulation, the venous-arterial, or capillary.

6. The influence of the agent on the temperature of the animal under the various stages of action.

7. The action of the substance on the respiration.

8. The action of the substance on the nervous organisms, and on the senses.

9. The mode in which the agent is disposed of or eliminated from the body.

10. The after effects of the agent on the body.

11. Relationships of action of isomeric substances.

12. The antagonism of action between two or more different substances within the living body.

These were the major questions asked in the research; but to them were added some others which were considered as side issues, although they were of marked significance. I note amongst them the following:—

(a) The influence on the functions of secretion and of excretion.

(b) The effect on the muscular irritability.

(c) The effect on the common sensibility.

(d) The effect on the blood, with special reference to the process of coagulation, colouration, and condition of the corpuscles.

(e) The degree and rate of absorption of the different substances by the blood at its natural temperature and pressure.

THE ELEMENTS OF MEDICINAL REMEDIES.

The elements which enter into the composition of remedies are twenty-two in number. They are:—

Oxygen, chlorine, iodine, bromine, sulphur. These I class together, because they have a certain action in common, as if they were modified states or conditions of some primitive element.

Hydrogen, potassium, sodium, magnesium, calcium. These also have some properties in common.

Nitrogen, phosphorus, arsenic, antimony, bismuth. These also have some properties in common.

Carbon, iron, mercury, lead, zinc, copper, silver.

I commenced the practical study of this subject in the year 1851, the anæsthetics, as then known, being the first to undergo investigation. The studies of these chemical bodies were for learning rather than for advanced work; but from the labour some new facts

came out, as, for instance, the curious fact that the smoke of the combustible substance *lycoperdon giganteum* contains a volatile narcotic substance which will produce a deep narcotism, under which any surgical operation could be performed painlessly. I conducted also at this time many experiments with different gases—with olefiant gas, nitrous oxide gas, and marsh gas; to which I may refer again at a later period of this history.

While so engaged, the idea of making a study of the elementary substances came into my mind. I was ambitious enough to hope that by this method I should be able to found a positive system of therapeutics, a system so clear that every student of medicine could learn it and practise by it with precision.

The idea, as it framed itself in my mind, ran as follows:—Presuming that we can determine the precise physiological action of each element, we may then, with precision, learn by a succeeding research what modification of action will take place if a substance be used composed of two elements, the value of each of which is individually understood. For instance, if oxygen be found to have a certain specific action of its own, and if nitrogen be found to have a certain specific action of its own, what will be the action of a compound substance in which oxygen and nitrogen are the combining elements? If this can be determined, what will be the action of a third substance to which another element is added? For instance, if oxygen produces one series of effects, and oxygen and nitrogen—nitrous oxide—produce another and distinct series of effects, what will oxygen-nitrogen and hydrogen (ammonia) do? And so on.

It occurred to me also at this time to ask, by experi-

ment, if in a medicinal substance made up of many elements the resultant action of it on the body is due to the combination of the elements, each one, as it were, contributing its equal part; or, if in each compound one particular element played the dominant part? In the action of chloroform, to take a simple example, is it to the carbon, the chlorine, and the hydrogen in equal force, that the narcotic effect is due? Or does one of the elements, say the carbon, act as the dominant?

Thirteen years, at least, after these speculations entered my mind, I expressed them at some length in my report on the physiological action of certain amyl compounds, read to the British Association for the Advancement of Science, in the year 1865, at the Birmingham meeting. The report will be found in the volume of Transactions for that year (1865) in full; but I may here quote from it the passages, on pages 280, 281, in which the ideas above-named are expressed. I had been speaking of the action of anylene, amylic alcohol, acetate of amyl, and iodide of amyl. Whereupon I proceeded to say:—

“The last lesson suggested by this research relates to the modifications of action exhibited in animals by charging them with the same chemical base but with diverse compounds of the base. A question was asked me last year by Dr. Heaton of Leeds, when my report on the nitrite of amyl was read, to this effect:—Is the action of the compound due to the base, or to the compound as a whole? I was unable then to answer that question properly. Now I can answer it; and I do so by saying, that in the midst of the phenomena observed the base amyl is, if I may use such an

expression, the key-note, but variations are introduced as new elements are added. The order of variation is most interesting. We take a simple hydrocarbon, the hydruret of amyl, and we find an almost negative body acting not unlike nitrogen and destroying motion and consciousness by deprivation of oxygen. We modify the experiment; we introduce the element oxygen by using the hydrated oxide of amyl, and there is added to the above-named phenomena violent and persistent tremor. We move from this to another compound; we let iodine replace oxygen, and the phenomena now embrace free elimination of fluid from the glands, with vascularity of the extreme parts and increased action of the heart and respiration. We change the combination once more to bring nitrogen and oxygen into operation with the base (as amyl nitrite), and the vascular action is raised beyond what is seen from any other known substance, to be followed by a prostration so profound that the still living animal might for a time pass for dead.

“It seems to me that in these experimental truths, so simple and yet so striking, we have presented to our minds a new line of therapeutical inquiry running somewhat parallel with that line of inquiry so prominent amongst our learned and more exact brethren of the Chemical Section, which they follow under the term ‘the law of substitution.’ I would ask:—Is there not a physiological law to be worked out similar in character, and might we not by looking into it become more sure and determinate in our knowledge and application of medicinal remedies? What if, after having learned the exact action on the economy of the organic bases, we followed the chemist, and by taking the compounds moulded on those bases, we learned

their true physiological values? Surely, if we did this, long though the labour should be, we might in time venture to lay down

“ ‘ This osier cage of ours
With baleful weeds and precious juiced flowers ’—

and without forgetting further the words of the wise friar,

“ ‘ Oh mickle is the powerful grace that lies
In herbs, plants, stones, and their true qualities,’

might begin to approach to that accuracy of knowledge, the absence of which makes us so weak and the charlatan so presumptuous; the possession of which makes the other physical philosophers so proof against presumption and so proudly certain in their stupendous knowledge.

“I can but feel fortunate in that, supported by the fostering care of this Association, I have been enabled to do even so much as turn the first sod in this great and novel field of labour,—I mean the investigation, physiologically, of the organic chemical compounds on a plan that aims at least at a principle in science, however obscurely it may have been propounded.”

To return to the narrative of original work in the first part of my researches. Having made up my mind as to the method, I proceeded with it far enough to find out that if it were to be carried forward systematically it would occupy every moment of my life, even though I should live to the full term of life. In time, therefore, the rigid rules laid down for work were broken as a regular course, but from then until now the method, through many disjointed researches, has been adhered to, and enough, I think and hope, has been

done to show to future students a very promising and useful field for labour, as I will now proceed to recount.

OXYGEN.

The experiments relating to the action of oxygen recorded in the last volume of the ASCLEPIAD were the first of the series bearing on the action of the elements. I need not repeat these, but may pass to observations on others of the elementary groups.

They began, as will be remembered : (a) By a research bearing on the action of oxygen in the fresh state and administered in current through a specially constructed chamber. (b) By a second research, in which the oxygen was devitalised by being made to pass backwards and forwards through the chamber. (c) By a third research, in which the oxygen, rendered active, or transformed into ozone by the electric spark, was administered by inhalation in that state.

BROMINE.

I classed bromine in the oxygen group, and I chose it for experiment because, being a liquid, it was easier to use than iodine.

Soon after the discovery of bromine by Balard in 1826 experiments were made in order to test its action on life and living phenomena, but so violent was it in its effects that the inquiry was never largely prosecuted. One drop of bromine placed on the beak of a bird proved instantly fatal, the fluid volatilizing so quickly as to produce an atmosphere directly toxic.

To remove this difficulty I commenced to study the effects of bromine by making a solution of it in absolute ether, in the proportion of one of bromine in two hundred

parts of ether. It could now be readily diffused for inhalation.

When bromine was inhaled after that dilution, I found that the effects it produces are those of slight constriction, followed by dryness of the mucous surface and by that kind of uneasiness which attends what is called a cold during the first stage. The effect is practically identical with that which follows the inhalation of ozonised oxygen. After a time this dryness is succeeded by a profuse secretion of fluid from the mucous surface, with an immediate sense of relief from the previous sensation. These symptoms occur invariably in the order named; but there is a difference according to the degree of time in which they are presented, the difference depending on the dilution of the element. If the dilution be little, the occurrence of over-secretion is so rapid that the first stage is liable to pass unobserved.

Applied direct to the skin, the bromine leaves a simple stain, followed by a tingling sensation, and after several repetitions by a sensation of local numbness. On mucous surfaces the effect is more determinate, the secretions of those surfaces are quickly decomposed, and the surface touched is at first shrivelled or shrunken. At the same time, bromine is not in the ordinary sense to be considered a caustic; for though it destroys surface, the destruction is different to that which takes place from chloride of zinc, nitrate of silver, or potassa hydrate. Neither is it a destructive like direct heat, or like that extreme cold which we get when compressed nitrous oxide is directed upon the tissues. Its action seemed to me to be peculiar to itself; an action not immediately upon the water of the tissues, but upon the colloidal fluids which the

tissues contain, a coagulation of those fluids, with a direct action upon the nervous fibre, by which there is arrest of nutrition. The part affected by the bromine, if it be sufficiently treated with it, dies or is removed as if by solution, but without ulceration ; a very important distinction from a therapeutical point of view.

Unless it be combined with some other substance that dissolves readily in water, bromine diffuses very feebly through the tissues even in life. Hence it may be freely applied to parts without danger of absorption. In this respect bromine resembles a colloidal substance in its action ; another property of extreme importance in therapeutics.

Administered to the body in combination with a soluble base, so as to produce a decided effect, bromine acts as a distinct sedative, as with bromide of potassium. This fact afterwards led me to prescribe the organic bromides, many of which are now extensively used. They include bromides of quinine, morphine, strychnine, iron, and combinations of these, in the form of syrups.

On the whole, I came to the conclusion that bromine possesses many of the properties of ozone. It is an oxidizer ; it is a nervous excitant, in a large dose a sedative in a smaller dose when administered internally. As an external application it is a destroyer of tissue without being a caustic, if by a caustic we mean a substance which destroys by ulceration.

COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FRIEND.

STRENGTH AND HAPPINESS.

(BY RICHARD A. PROCTOR.)

MR. PROCTOR is so well known all the world over, it is only necessary to see his name attached to a book to feel a desire to open the work and read. It matters little what may be the subject of the treatise, it is sure to be written upon in a style, and with an intelligence, that will, without fail, prove of instruction to the reader. This little book is a fair specimen of Proctorian skill, although it can hardly be considered as one of the studies with which the learned author is most familiar. I would rather read him on astronomy ; but then, how much more delightful and fascinating is the theme !

The volume in hand, got up in Messrs. Longmans' usual and excellent style, is divided into two parts, the first entitled "Strength," the second "Happiness." In the section on "Strength" Mr. Proctor has a chapter on learning to swim, which of itself is a small treasure. He insists, as I have so often insisted, that

every girl in the land, as well as every boy, should be taught to swim as certainly as they should be taught to walk. He goes further than this: he contends that the mode of teaching to swim now in vogue is so stupid that the young are positively prevented from acquiring the art by the folly of the instruction. "No one," he says, "ever yet learned to swim all at once; and many are prevented from learning to swim at all by the circumstance that every one fails who tries to do what most books on swimming tell him to do, and what professors of swimming pretend to expect him to do." Some very good and simple rules are supplied in regard to first efforts. The learner should never stand breast high in the water on a sloping shore, nor where there is any stream. He should be content to stand in water some three or four inches below the armpits. If there is a stream he will do well to fasten round his waist a stout cord, attached to some trustworthy post on the bank. In fact, avoid all danger, for the tyro will not learn the worse for being safe. The second point is to get the art of retaining the balance. So soon as this has been learned, the beginner can balance himself readily, without at first advancing or turning over or using his legs; after that will come the time for learning other things, amongst them swimming, which is something more than balancing the body afloat in the water. Having acquired the art of balancing easily in the water, the learner is practically master of the situation; he can go on to get the stroke, and to propel himself for short distances. Next he learns to float on the back. This is a very short account of the rules supplied by our author, to whom it is right to refer the reader who cannot swim, for particulars. He will not be disappointed, and if he is not more than usually dull

he may acquire from these lessons the art of swimming without the aid of a master.

The second part of Mr. Proctor's book is exceedingly useful both for schools and families. It is full of sound advice on numerous common and common-sense topics, including a study of the system of morals, in which "duty depends on happiness and fulness of life in self and others." In this section we have brought before us six deeply interesting chapters on subjects of everyday life, and yet of vital character—"Conduct and Duty." "The Evolution of Conduct." "Right and Wrong." "Care of Self as a Duty." "Care of Others as a Duty," and some "Conclusions." These form, altogether, a series of readings which the young cannot learn too early nor the old retain too late in life.



THE INFLUENCE OF SEX IN DISEASE.

(BY W. ROGER WILLIAMS, F.R.C.S.)

THIS is one of those excellent books which ought to have been noticed many months ago, and which has really been put aside in order that it might be more carefully studied,—a delay for which I trust its able and industrious author will grant absolution.

Hitherto the important subject of the influence of sex in disease has been studied in so fragmentary a form that no correct details of an extensive or reliable character have been given to the world. Certainly nothing like that which is presented in the compact and valuable little volume now under review has yet been seen in an English dress. The author opens with the statement of some general facts leading up to the

special. He points out that in all statistical records females are found to outnumber males. This, as Arbuthnott originally showed, is the more remarkable because the male births invariably outnumber the female, standing in the proportion of 104 of the males to 100 of the females. A table is then supplied, in which it is shown that in the mortality of the two sexes the rate, through all the periods of life, is highest on the male side. Even in infancy this rule obtains, the male mortality under five years being in England as 71 to 62 of the female, and so on through eleven following periods, the women showing to the last a better vitality than the men in the proportion of deaths of 311 males to 287 females. Thus, as Mr. Williams says, "from the peculiarity being strongly developed during infancy, when the dress, food, and general treatment of both sexes are alike, it may be inferred that the higher male death-rate is chiefly the result of some constitutional condition inherent to sex."

In accordance with these facts, males are, on the whole, more liable to diseases than females; but of the great classes of disease in which there is most distinction women suffer out of all proportion from diseases of the generative system, and men from those of the urinary system.

An extremely useful table follows here, in which the diseases to which females are most liable are placed side by side with the diseases to which men are most liable, and both finally by the side of a third table, in which the diseases to which both sexes are equally liable are recorded. As these tables are drawn out from definite facts they are, it must be assumed, beyond dispute. Still it is surprising to the common

experience to find that strangulated hernia is as fatal amongst women as men, and yields as large a mortality.

In another series of tables, derived from the returns of the in-patients under treatment at the Middlesex Hospital during the years 1877-82, and at St. Bartholomew's during the years 1878-83, and from the returns of the Registrar-General for the twenty-five years 1848-72, the relation of diseases of the zymotic class in the two sexes is carefully indicated.

After the tables the inferences to be drawn from them are detailed, and, when necessary, other tables are added in order to illustrate special points. Some most striking facts are exhibited in this way on the subject of neoplasms or new growths. A list of eleven thousand one hundred cases is given, in which it is shown that of persons affected by these growths the percentage proportion is 33 male to 67 females. Of cancers the percentage proportion is one male to 1.85 females, in cases derived from hospital practice; and 1 male to 1.98 females in the latest returns of mortality. In contrast with these facts relating to cancer in the female, there are other facts showing that some diseases are most frequent in the male; thus diabetes is about twice as common in the male as in the female, and Addison's disease is about three times as common.

It would be quite a pleasing task to follow Mr. Williams through all his calculations and deductions, and to the pleasure much profit would be added for the reader of the *ASCLEPIAD* as well as for the writer of it. But the book is one to be read in full, not through a review; a book to be learned in detail, and to be kept close at hand for constant reference.

THE DISEASES OF THE BIBLE.

BY SIR J. RISDON BENNETT, M.D., LL.D., F.R.S.

THE reference to this work, written for the Religious Tract Society by Sir Risdon Bennett, comes before us appropriately in connection with the life of Dr. Richard Mead, which appears in a previous portion of this number. Mead, as we have seen, published towards the close of his life the *Medica Sacra*, a book intended for the learned of his day. Our present author puts forward his little volume for the ordinary student, endeavouring as far as possible to use a method and language that will be of service to the general reader, but confining himself mainly to the medical aspects of the subjects discussed. The work which has thus been produced will be found of singular interest to students of every class of the student world, not only because it is written in the pure style of one of the gifted men of modern medicine, and a scholar withal, but because to every one the subject is a constant and certain theme of wonder and curious speculation which never ceases and never wearies.

Sir Risdon discusses, under the diseases named in the Bible, the following—(1) Lepra of the Greeks and the modern psoriasis; (2) Elephantiasis Græcorum; (3) the Levitical disease; (4) the leprosy of the New Testament; (5) plagues; (6) boils and blains; (7) fevers and inflammations; (8) ophthalmic diseases and blindness; (9) diseases of the nervous system, including lunacy and demoniacal passion; Saul's disease; Nebuchadnezzar's disease; paralysis and palsy; (10) diseases of Job, Herod, Hezekiah, and Jeroboam; and disease of the Shunammite woman's son. To these descriptive

chapters are added others, on old age, on the physical cause of the death of Christ, and an appendix. It will be gathered from the above brief record that topics of a varied and absorbing character, in a biblical and historical point of view, are brought under notice; and although the members of the medical profession may be the first to "read, mark, learn, and inwardly digest" its contents, this book, were it to become widely known and read amongst the members of the sister profession, the churchmen of all Churches, would find a wider sphere than amongst the men of physic. To the doctors of medicine it will be a book to read, and to lay by as a learned and curious work; to the doctors of the Church it will be a text-book from which they can preach, and from which, treading on safe ground, they can illustrate many a difficult text in a manner and with a facility they never felt before. It is only necessary to add that the two eminent scholars Dr. W. A. Greenhill and the Rev. Dr. Green have assisted the author in his work, to make it sure that all that perfect erudition could secure has been secured for the luminous exposition of a treatise that cannot be read without knowledge, nor laid down without gratitude.

EUTHANASIA.

(BY WILLIAM MUNK, M.D., F.S.A.)

METHINKS my learned brother the author of this very interesting book, must in some pre-existent state have been the leading occupant of a stall in a scriptorium, where, to the admiration of the whole of the brethren, he gathered together all the rich literature of his time, and placed it in such splendid form as to command

the attention of every one who came to visit him and his chosen associates. His last book, in his present sphere, is this on "Euthanasia," published by Messrs. Longmans, a little work of one hundred and five pages but full as an egg of good and practical reading. The object of the book is to indicate the medical treatment in aid of an easy death. The subject is brought before us under three heads—(1) "On Some of the Phenomena of the Dying;" (2) "On the Symptoms and Modes of Dying;" (3) "On the General and Medical Management of the Dying."

It must be understood that in these chapters Dr. Munk keeps, exclusively, to the medical aspects of the question, and in a manner strictly practical and natural. He makes no proposition for hastening the approach of the arch-enemy; but, whatever a good, and feeling, and sensitive physician can do to alleviate those who are about to quit the world for ever is described in a spirit as tender as it is wise. It would be wrong to say that all physicians will agree, out and out, with the rules which the author lays down; but it may safely be said that every physician ought to know the views of one so competent to form and offer a judgment on every topic that he has laid before his readers.

It is gratifying to be able to confirm, from personal observation extending over a long series of years, the statement of Dr. Munk that, as a general rule, "the very act of death is but rarely and exceptionally attended by those severe bodily sufferings which in popular belief are all but inseparable from it, and are expressed and emphasised in the terms 'mortal agony' and 'death struggle.'" I can corroborate all that my friend says on this matter. It has befallen me but once to witness the terrible scenes which are so

sensationally described in song, in story, and in sermon, and in that very exceptional instance the terror and pain which was developed was induced by the too fervid zeal and over nervous anxiety of an attending friend, whose dismal ministrations would have made a saint doubtful and despondent. I can bear witness also to the fact that the statements of those who have recovered from the unconsciousness of apparent death have, on more than one occasion, conveyed to me the assurance that the stage of oblivion came on without a pang or a fear, and was attended rather with a sense of pleasurable feeling than of pain. There are many other topics in which Dr. Munk's experience would tally with my own, and, I doubt not, also with that of the many of his other *confrères* who will compare what they read from him with what they have seen for themselves.

OPERÆ PRETIUM EST.

AMONGST other books, papers, and essays which have come to hand, and which are deserving of special study, may be named:—

- (1) "Abdominal Section for the Treatment of Intra-Peritoneal Injury," by *Sir William Maccormac, F.R.C.S.* (Ballantyne Press, 1887);
- (2) "The Saliva as a Test for Functional Disorders of the Liver," by *Samuel Fenwick, M.D.* (London: J. & A. Churchill, 1887);
- (3) "Our Erect Attitude," an Essay, by *John Wilson, M.D.*, with a Supplement (Glasgow: Macdougall, 1888);
- (4) "Health Resorts at Home and Abroad," by *M. Charteris, M.D.* (with a very useful map) (London: J. & A. Churchill, 1888);
- (5) "The Tapetum Lucidum and the Function of the Fourth Pair of Nerves," by

Henry Lee. Two essays of singular ability as to argument, and showing that the original mind of Henry Lee is as active and bright as ever. (London : J. & A. Churchill, 1887.) (6) "Diagrams to Illustrate the Relations of Certain Meteorological Conditions to Diseases of the Air Passages," by *Henry B. Baker* (Lansing, Michigan, 1887.) (These diagrams introduce an excellent method of taking records specially useful to medical officers of health.) (7) "The Carbonic Acid, Organic Matter, and Micro-organisms in the Air, more especially in Dwellings and Schools," by *Professors T. Carnelley and J. S. Haldane*, and *A. M. Anderson, M.D.* A paper, read before the Royal Society. Rich in useful information, laboriously collected, and rendered with admirable freedom from the modern speculative crazes. (London : Trubner & Co., 1887.)

POST SCRIPTA.

THE APPENDIX.

The Appendix of Acknowledgments of Books, Pamphlets, Magazines, Reports, and Exchanges for this quarter will be published in the next number of THE ASCLEPIAD.

TO CORRESPONDENTS.

Books, Reports, and Pamphlets intended for notice in THE ASCLEPIAD, should be addressed to the Author at his residence, 25, Manchester Square, London, W.

Names of Subscribers and other Matters of Business should be forwarded to Messrs. Longmans, Paternoster Row, London, E.C.

Advertisements, and all Communications respecting them, should be forwarded to Mr. A. P. Watt, 2, Paternoster Square, London, E.C.

The Author will be greatly obliged if senders of Newspapers and Magazines would kindly mark the passages to which they wish to direct attention.

February
15th,



1888.



*ALCOHOL AT THE BEDSIDE. A CLINICAL
STUDY.*

IN an essay on Intermittent Pulse, written in 1869, I spoke favourably of alcohol in the treatment of extreme cases of intermittency, and gave a formula for its administration which has been very much used. Since I have taken up the advocacy of total abstinence from alcoholic drinks I have been challenged in respect to the above-named recommendation, as if there was something in it entirely contradictory to the principle of total abstinence from the ordinary use of alcoholic beverages.

Such contradictory method does not, however, lie for a moment at my door. No man can lead an active outspoken life and at the same time a life of continued learning—in which the student's is always the first part—without finding that something he has said requires correction, or it may be retraction. Conscious of this fact, I have ever aimed respectfully to follow the best example of men who, under a like experience, have been obliged to take action on themselves—namely, by correcting or retracting whatever in their

own minds and clear judgments they have seen occasion to recall.

In the present instance there is no necessity either for correction or for retractation. Between the general use of alcohol as a supposed food or luxury, and its use as a medicinal agent, there is the broadest distinction, —a distinction as broad as that which exists between opium as a food to the opium-eater and opium as a medicine for the sick; and I have never given up the medicinal use either of opium or of alcohol. On the contrary, it has been my steadfast study to learn, with all possible accuracy, the therapeutical value which alcohol really possesses; to compare it, in respect to its action, with other medicinal agents with which it is therapeutically allied, and to make sure when to administer it, and how to administer it with prospect of good and certain success.

In this sense I have specially devoted attention to the study of alcohol as an antispasmodic. If alcohol have any particular medicinal virtue it must, as an antispasmodic, be peculiarly useful. All physiological observation upon the effects of alcohol points in that direction. Alcohol relaxes. It relaxes the blood-vessels to their extremest subdivisions; it relaxes muscles until they fail to respond to their nervous stimulus. "Helplessly drunk" is the common phrase employed to designate the man or woman who is paralysed by alcohol.

Alcohol relaxes the organic muscular fibre so completely that the relaxation induced by it continues after death. In one of my experiments on resuscitation and artificial circulation, communicated to the Royal Society in 1865, I found that when a rabbit was suddenly killed in the usual way by a blow on the back of

the neck, such was the resistance, due to the shock exerted on the blood-vessels, it was easier instantly after death to rupture the aorta by the pressure of an injected fluid than to inject the fluid over the arteries into the veins. I found also that the difference of some agents over the body immediately before or immediately after death intensified this resistance, while others reduced it. Chloroform and all its allies of the chlorine group intensified; the alcohols, methylic and ethylic, and their respective ethers, together with methylal, and amyl nitrite, so reduced it, that injection through the minute circulation was easily effected when they had been brought into action.

ALCOHOL IN ACUTE SPASM.

Utilizing these facts, I was led, almost immediately after my first experiments with amyl nitrite in 1860-2, to put alcohol and the nitrite in the same position as relaxing chemical agents on organic and voluntary muscular fibre. Thus, therapeutically, alcohol comes under the old head of an antispasmodic, and it is as such that I have since more carefully studied its clinical value.

In making this explanation I do not wish to assume that alcohol is of no other medicinal use than as an antispasmodic. It is an antiseptic; it reduces the animal temperature, and in that respect may be considered a febrifuge; it coagulates blood and albuminous fluids, and in that sense may be called a styptic. Its values in all these directions are different, and, perhaps in all, comparatively little, when tested by the side of other agents: but I leave these considerations for the moment, in order to keep to the great one—its service as an antispasmodic.

As an antispasmodic, ethylic alcohol holds a place peculiar to itself. It acts very much more slowly than amyl nitrite, ethylic ether, or methylic alcohol, and for that same reason its relaxing action is much longer kept up. Thus, in sharp spasm, such as that of angina, colic, tetanus, asthma, the action of amyl nitrite is quick, determinate, and at the same time evanescent, while the action of alcohol is too slow to effect relief in any such space of time as would prove to be useful in emergency. What is more, the quantity of alcohol required to produce a relaxing effect in such cases is so great that other evils are apt to arise from the complication.

It is scarcely correct, therefore, to say that alcohol is a good antispasmodic in cases of acute, tonic, or tetanic spasm. But in such cases it becomes a convenient and compatible vehicle for the more active direct antispasmodics, and as such I frequently prescribe it. Thus, in angina pectoris and in pure spasmodic asthma, I commonly order for an adult the following mixture:—

Amyl nitritis $\mathfrak{m}$ iij.

Alcohol (sp. gr. .880) $\mathfrak{z}$ ss.

Aq. destil. $\mathfrak{z}$ j.

Fiat haustus.

This, with a little more water added to it to render the dose agreeable to the taste, is both rapid and continuous in its action. I have a patient suffering from spasmodic asthma, who for ten years past has always carried this compound with him. He has invariably some preliminary indications of an acute attack in the form of constriction across the chest, rapid and strong action of the heart, and coldness of the hands and feet. Before he took the remedy above named he found

more relief from a sharp walk, or even a run, than from any other course of treatment, and he sometimes could stave off an attack by this plan. Now he at once takes his draught in cold water, ice-water if he can get it, drinking it slowly, and he so certainly obtains the desired relief that for many months he keeps free of an attack. In this instance the alcohol keeps up the action of the nitrite, and this mode of administration contrasts well with the mode I originally suggested, namely by the process of inhalation. The patient was first treated by inhalation of the nitrite, and so obtained relief, but it was a temporary relief only, and not comparable in result to the present method. In this instance the sufferer is a total abstainer from alcoholic beverages, for which reason so small a dose of alcohol as half a fluid ounce suffices, often without repetition, to sustain the relaxation. He is, however, instructed to repeat the dose every half-hour three times, if relief should not follow at once. A few times he has been obliged to take a second portion.

I have followed the same mode of using alcohol with amyl nitrite as an antispasmodic in cases of angina pectoris, but I cannot say with the same good result. Paroxysms of angina in those who are subject to them are so terrible that they keep the sufferer ever on the point of expectation and dread that they are about to recur. The result is that patients constantly have resort to the remedy, a practice which leads to two bad results. In the first place, a craving for alcohol is soon created. In the second place, that craving once established, itself keeps up a condition of alcoholism which is most depressing, which promotes trepidation and anxiety, and which tempts the seizure.

Further than this, the alcohol, if long continued, keeps up a form of acid dyspepsia, during which the urine becomes charged with uric acid, the secretions of the skin are made very acid, and the whole body is thrown into a state of rheumatic or rheumatoid disorder. Lastly, the effect of the alcohol as a continued antispasmodic is soon lost, unless the dose be steadily increased, when the action of the amyl is, from the dilution, itself also reduced in efficacy.

Except, therefore, in rare instances, I have given up the employment of alcohol as a menstruum for amyl in angina, and have returned to the plan of administration by inhalation,—a plan that usually leads to instant relief, does not cause dyspeptic disturbance, and does not lose, signally, in its effect, even after several months—I had almost said years—of employment.

ACTION OF ALCOHOL AS MODIFIED BY ITS SOLUBILITY.

Let me dwell for a moment on the question of loss of effect from medicinal substances. This, as I think, turns mainly on the solubility of the substance in the blood, and the fluids of the tissues. If the substance is very soluble, so that large portions may be taken before there is saturation, the effect first produced is soon liable to be lessened unless the quantities be increased, whereupon there is, in time, set up by it a series of systemic changes which are physiologically different from those which, in the first instance, were simply useful. If, on the other hand, the substance is practically insoluble in the blood and fluids of the tissues, the secondary effects due to increasing absorption are avoided, and the agent continues to exert its primary influence from much the same dose for a

long and practically an unlimited period. Alcohol and amyl nitrite are examples in point. Alcohol, easily absorbed and diffused, requires an increasing dose, leading to new and unnecessary phenomena. Amyl, comparatively insoluble, repeats its action again and again in the same manner, and with good effect. Anhydrous ether, another antispasmodic, resembles amyl nitrite in this respect, but, being more soluble, not so completely. Ether may, however, be repeated in the same dose an immense number of times without losing its effect, and without exciting systemic changes or structural devastation.

ALCOHOL AS A REMEDY FOR SHOCK OR STUN.

The diffusibility of alcohol in the blood and through the body renders it, in cases, a bad antispasmodic where it is often required. But this very fact of diffusibility makes it as useful in other cases, where an equable diffusion through the body is the best line of practice to be pursued. In illustration I may mention examples of shock or stun, mental or physical, as cases in point. During shock, as from a blow or from fright, the pallor of the face indicates the resistance that has occurred in the terminals of the circulation, while the heart sharing, through its vessels, in the same catastrophe, is unable to meet the strain to which it is subjected. Here alcohol acts perfectly as a restorative, when it can be administered and absorbed. Diffused through every part, it causes a relaxation, under which the heart is relieved, the circulation is set free, and the animation is restored. In short, just because a man intoxicated from alcohol bears shocks which might be fatal to a sober man, so a man under shock is relieved by alcohol. In the first case

the body is in a condition under which the organic motor-fibre is enfeebled by the alcohol, and rendered irresponsive to the concussion; in the second case the contracted organic fibre is relaxed by the alcohol.

It is no paradox to say that in this particular mode of action, in cases of stun, alcohol resembles blood-letting. The old practitioners drew blood from persons stunned by physical or mental shock, and if they succeeded in getting a current of blood they were accustomed to witness a quick re-animation. I have seen this phenomenon myself in the early part of my career. What occurs from this process is relief to the right side of the heart, removal of pressure and of resistance to the heart-stroke, so that the heart is enabled to rekindle motion. The relaxing influence of alcohol is of the like character of relief.

ALCOHOL AS PRELIMINARY TO GENERAL ANÆSTHESIA.

For the same reason alcohol is a good agent to administer just before the administration of those anæsthetics which produce contraction of arterial fibre and convulsive spasm. This action belongs to all the members of the chlorine family,—to chloroform, singularly, and is no doubt—as I have pointed out over and over again—the chief cause of danger. To give a dose of alcohol therefore, a dose sufficient to produce a demonstrable physiological effect, before administering chloroform, is sound physiological practice; and I attribute much of the success which attended the administration of chloroform in my hands to this detail. I noticed so often that a full dose of alcohol lessened the direction and intensity of the second or convulsive stage of chloroform, that I invariably gave a full dose before beginning to apply the inhaler.

In my lectures on *Materia Medica* to the Royal College of Physicians I also made this point a matter for direct demonstration. I showed the action of chloroform, of ether, and of chloroform after a subcutaneous injection of alcohol, on the hearts of three guinea-pigs that had been let sleep to death in the vapours. In the animal that had died under chloroform the heart was dead and the lungs pale: in the animal treated with ether the heart was briskly beating on the two sides, and the lungs were filled with blood. In the animal that had been treated first with alcohol and then with chloroform, the heart was beating regularly on both sides, and the lungs were filled with blood.

Again, I showed an analogous experiment in my experimental lectures on Artificial Respiration. I showed two rabbits that had been made to cease to breathe in chloroform vapour, but one of which had previously been injected with alcohol. I started the process of artificial respiration in the two at the same time as they came out of the narcotising chamber; and demonstrated that while the one that had been charged with alcohol was restored with the utmost readiness, the other was helplessly beyond restoration.

The antispasmodic action of alcohol is here shown at its best, and I should still, were I about to take or to administer chloroform, call for a preliminary dose of alcohol. For ether and nitrous oxide such a precaution would not be necessary; for methylal it would not be necessary. Those agents themselves play the same part as alcohol: they relax the arterial fibre.

ALCOHOL DURING ARTERIAL RESISTANCE.

The value of alcohol is realized again in other classes of disease or derangement, which have not, up to

the present time, been properly defined or recognised. I refer to conditions in which the balance between the impelling stroke of the heart and the recoil of the arteries, is not in perfect order. In these instances we get the strange anomaly of a powerful impulsive heart, with a small feeble pulse, cold extremities, and pale surface of body. The persons in whom this condition exists are usually men of early middle age, of nervo-sanguine temperament, of active mental and physical habit, and of restless disposition. They are often men of letters, or artists, or are engaged in speculative business operations; and they are, as a rule, of rheumatic or gouty diathesis. Under undue pressure, hurry, or sudden fatigue they become suddenly unwell and say they are prostrated and disposed to sleep, or feel as if they could not keep awake. They are lifeless by comparison with what they were, and they are conscious of great irregularity and palpitation of the heart. They digest badly; they complain much of cold; they complain much of giddiness, and explain that they are nervous on the commencement of any public duty. The physical examination of these persons may show no special disease of the heart, but an irritable and impulsive heart, with a very feeble pulse and a low temperature.

The symptoms in these examples all point to the one deranged condition. There is an irritation, extending through the whole of the arterial system, by which the resistance to the flow of blood through the body is impeded. This leads to a temporary impairment of nutrition, and to central nervous exhaustion. In plain terms, there is spasmodic peripheral resistance from an irritation which is also felt by the heart itself.

In these cases, if attention be paid to the secretions

as a preliminary; if the mind be relieved, as far as is possible, from worry; if daily exercise be enjoined, with early hours for going to bed, and if full quantum of sleep be secured, the symptoms often pass away without other aid. But this is not always the case, and when the phenomena continue, alcohol, judiciously administered for a short time, is of signal service.

Another class of case resembling the above is often met with, in which there is dryness as well as coldness of the skin, attended with lepra or psoriasis. The patients in these cases have, as a rule, a syphilitic history, acquired or inherited. In them the action of the heart is intense, with a feeble pulse and nervous exhaustion. These are benefited by alcohol in properly administered doses. I usually prescribe for an adult in such examples:—

Liquid arsenite of potassa $\text{m} \text{v}$.
Pure glycerine ʒj .
Alcohol (sp. gr. .830) ʒss .
Distilled water ʒj .

To be taken in half a tumbler of water three times a day after food. In some instances I also add to this prescription three minims of the nitrate of amyl, and I have seen recovery, when arsenic alone has failed, commence immediately on the addition of the antispasmodic.

There is a third class of case in which the phenomena are much the same, but arise from conditions that are different as to origin. In the cases now referred to there is probably no resistance to the circulation of blood from undue contraction of arterial muscular fibre, but there is relative resistance, owing to the circumstance that the action of the heart is enfeebled, and cannot fairly overcome the natural tension.

In such cases half a fluid ounce of .830 alcohol administered once or twice a day, with iron if required, or nux vomica, or digitalis, is of the utmost service.

The old-fashioned Griffith's mixture, Mist Ferri Comp. of the old Pharmacopœia, goes excellently with the alcohol in the proportion of one fluid ounce to half an ounce of .830 alcohol.

There is another form of case, in which the seat of the spasm is in the stomach or intestines, and in which, after taking food, or after long abstinence from food, or after much mental or bodily fatigue, the patient is seized with severe pain and faintness, symptoms not relieved until there is escape of flatus. These cases are sometimes accompanied by what is commonly called gastrodynia, and the spasm, which is their marked symptom, varies from uneasiness and oppression to the most acute suffering.

In this state of disease there cannot be a doubt that alcohol gives relief. It reduces spasm and permits the full escape of gaseous products, and so it relieves pain, and brings speedy quiet. There are no cases in which alcohol acts more promptly than these. There are, unfortunately, no cases in which it proves a worse friend. On one hand we must not, by any false enthusiasm, deny its efficacy; on the other hand we must not, by any bigoted sentiment for it, deny its danger. Carried a very little too far, it loses its effect, until a slowly fatal dose becomes almost a necessity of life. The patient, under the physician's own guidance, is, in fact, rescued from Scylla to be sacrificed to Charybdis. These are, *par excellence*, the cases that excite in the sick the desire for alcohol. The sufferers are of nervous or nervous lymphatic temperament, and they soon like and long for more than

the direct relief from the too diffusible stimulant. From the local relief they court the universal degeneration.

I rarely see a week go by without having before me one of these examples of what may well be called nervous indigestion and spasm. I confess at once the extreme trouble and anxiety they are to a conscientiously anxious mind, which has to balance between the certain immediate good and the all but certain and distant evil.

I always attempt the treatment of these cases without resort to alcohol. If there is pyrosis, which is a very common accompanying symptom, I forbid specially two kinds of food, oatmeal and tea. I then prescribe for the dyspeptic symptoms correctives for the secretions and one or other of the digestive ferments—pepsine, pancreatine, or diastase. For the spasm I prescribe bicarbonate of ammonia and potassa, with nitrite of amyl and infusion of cloves, using glycerine as the solvent for the nitrite. The prescription usually runs:—

Bicarbonate of ammonia gr. v.
Bicarbonate of potassa gr. x.
Glycerine ℥j.
Amyl nitrite ℥ij.
Infusion of cloves ℥j.

To be taken when the spasm is present, and repeated every hour until relief is obtained.

Only when this fails, or when this and other agents fail, do I resort to alcohol. Then I add to the above from half a fluid ounce to six fluid drachms of .830 alcohol, for brief periods of time, withdrawing the alcohol as speedily as is possible.

ALCOHOL IN NEURALGIA.

Looking upon neuralgia as a form of vascular spasm in tracts of nerves, we have a very clear idea of the reason why antispasmodics are often so useful as immediate remedies. The alcohol in port wine has, for this reason, obtained its reputation for the relief of tic. But if, after the relief from relaxation has been obtained, there is one agent more than another which sustains the systemic irritation on which the pain rests, it is alcohol in any shape, and especially in that unknown sweet quantity called, ironically, port wine.

Admitting, therefore, the relaxing power of alcohol in the neuralgias, we have in using it always an ultimate danger to face, and happily we are not, I think, any longer obliged to face that danger. In croton chloral, and in croton chloral combined with quinine, we have an instant means of relief, more effective than alcohol, and free of its evil. For many years now I have successfully replaced alcohol by this combination, for the knowledge of which I am indebted to my good friend Dr. Elliot, of Hull. The formula is as follows :—

Croton chloral gr. ij.

Quinine gr. ij.

Glycerine *q. s.*

To make a pill to be taken when the attack threatens, and to be repeated every two hours until relief is obtained.

ALCOHOL FOR PAINFUL MENSTRUATION.

The peculiarly painful spasm which attends the menstrual period in some women, and which becomes neuralgiac in its character, is another affection which comes strictly into the present subject. I do not

deny for a moment that in these cases a full dose of alcohol—a very full dose—often repeated, relaxes, and so brings relief. But perhaps never was so much evil bought at the price, as in these examples. That utterly untrustworthy compound sold as gin is the fluid with which unhappy sufferers, often in 'early years, are dosed on these occasions. One of my lay friends who has a large number of women in his employ in a factory, writes to me on this topic, stating the demoralisation that the practice brings. He says: "In the young hands the time when the natural period is on is easily known by the odour of the gin in their breath." "My wife," he adds, "with motherly care, has been frequently amongst them to try to dissuade them from the practice, for unfortunately the habit of taking the gin at these times soon infects the whole flock—sufferers and non-sufferers alike. But all her efforts are unavailing. The reply is that the gin certainly relieves the pain, and when the doctor is referred to he is said to confirm the statement, and I have been told that you confirm it. But cannot something else be done?"

In better classes of society than factory girls this same practice prevails, and we have all of us often to sanction it or replace it. It struck me some time ago, that possibly the juniper which is present in gin might be in some degree the useful agent. Juniper increases the secretion from the kidney like ethyl nitrite, and might be worth using, apart from the idea of gin. I have, therefore, given it in combination with croton chloral in proportion of three minims of the oil with two grains of the croton chloral made into a draught with glycerine and water.

This answers exceedingly well, and I press its use

earnestly on attention. The formula stands as follows :—

Croton chloral gr. ij.
Oil of juniper miiij.
Glycerine ʒj.
Distil water ʒjss.

To make a draught. To be repeated every five or six hours until relief is obtained.

ALCOHOL IN HYSTERIA.

In the spasmodic varieties of hysteria, with its neuralgia and other imitations of acute disease, we meet with many conditions in which the questions that have been already before us come up for consideration.

In these states of systemic derangement we have to confront conditions in which the immediate action of alcohol as an antispasmodic would be indicated. Here, however, according to my mind, a line should be sharply drawn. If there is any known agent which above all others sustains the hysterical condition it is alcohol. For this reason, I, for my part, leave it out of the list of remedies altogether, not because I doubt its effect to relieve, but because I am sure that its effect to sustain the evil far outbalances the temporary advantage. There is a stage of alcoholic intoxication, the second, which practically is a form of hysteria, and I know of no precise method of prescribing alcohol that will not advance upon that stage and intensify it.

ALCOHOL IN FEVER AND IN FEBRILE CONDITIONS GENERALLY.

There is no great question which agitates the minds of sensitive men of physic at the present time more acutely than the question whether or not alcohol should be

administered in febrile states of disease. There are some who treat the doubt with supreme contempt; who, of headstrong will and obstinate habit, laugh at all who doubt; and who, to use their own language, "throw in stimulants" with as little hesitation as they might be entitled to claim if they fully understood the action of alcohol on the body, were certain of the composition of the substance they were "throwing in," and were absolutely sure that the results they observe were due entirely to their treatment, and were not possibly due to the return of the organic functions to their condition, or to some other cause with which they have had nothing whatever to do. There are others who obstinately disbelieve in the use of stimulants altogether during febrile states, and who set their faces dead against the smallest administration under any circumstances. There is a third and more numerous set who, distracted by the assertions of the two contending sects, are fairly bewildered, and are never sure of the right time to administer a so-called stimulant, or of the right thing to administer, although they have not given up their allegiance to the practice of stimulation, nor to that supreme representative of it, alcohol.

It may be that both of the two first contending sections are wrong, but of the two the one that blindly "throws in" so potent an agent as alcohol, is by far the most wrong.

For my part, I would not, on any account, deprive myself of the privilege of employing alcohol, as alcohol, in fever if the reasonable necessity were fairly and fully presented. But what, someone will ask, is the reasonable necessity?

In answering this enquiry we must remember the true action of alcohol,—that it is a relaxant; and must

consider whether it can be of any use in this capacity in cases of fever. This, in my judgment, is a point on which, without prejudice, a word may be said in favour of the strict and scientific employment of alcohol. When fever runs high the arterial resistance is of the extremest kind. The mode in which death takes place is by the exhaustion of the heart, owing to the resistance to the course of the blood through the minute circulation. If, therefore, alcohol will relax this resistance, it may be of service; and I am not prepared to declare that it is not so. It would be a bold and bald statement to say that at critical crises of fever, when the heart is sinking from excessive fatigue owing to the extreme friction in the peripheral circulation and to the over tonicity of the arteries everywhere, relief has never been obtained by the administration of alcohol. It is difficult to be positive on this matter, because the purely empirical manner of administration has, so far, prevented the revelation of any positive truth, and has perverted the judgment so egregiously that, under the conditions named, the very effect of relaxation, by which the heart is allowed to work with greater ease, is commonly considered as a sign or proof that the heart has been stimulated.

The argument is as childish as it would be to affirm that when a scotched machine is set free by the cooling and the oiling of a heated axle, the treatment stimulated the engine; but it is accepted generally as sufficient, and is so misleading that no reliance can be given to it.

I leave the question of the value of alcohol in fever as one waiting for light derived from exact knowledge, knowledge that can alone be attained by a just and unbiassed series of observations, of which there is not, up to the present moment, a single line of sound

evidence, of evidence that would be sufficient in law to be allowed to establish a case in a court of first instance.

MODES OF ADMINISTRATION OF ALCOHOL IN DISEASE.

Let me now pass on to consider the mode of administration of alcohol for medicinal purposes.

In my lecture on the Alcohols, published so far back as 1869, in the *Medical Times and Gazette*, I wrote :—“Alcohol, one of the most commonly used of accredited remedies, has never been properly tested as a remedy for human diseases. I mean by this that it has never been tested as alcohol of a given chemical composition, of a given purity, and in given measures. Wines, beers, and spirits are anythings, compounds of alcohols, and compounds of alcohols with ethers and other foreign substances. It is time now, therefore, for the learned to be precise respecting alcohol, and for the learned to learn the positive use of one of their most potent instruments for good or for evil.” In the nineteen years that have passed since that was published, I have steadily followed out the practice there suggested, and for fifteen years past have never prescribed alcohol in any other form than the .830 ethylic alcohol—the ordinary pure but not quite absolute alcohol of commerce. I have known, therefore, in prescribing alcohol, for these years, the precise thing prescribed,—which is, I think, what few can say. I have by this means learned the value of dose, as well as of action. If I have wanted any other of the agents that belong to alcoholic beverages—the bitter of hop, diastase, an ether—I have added it in the same precise manner, and I most respectfully suggest that this is the only way in which alcohol can be scientifically applied in the treatment of disease.

The advantage is all on the side of accuracy ; but there is another and more cogent reason for this rule. By following it alcohol is kept in the hands of the prescriber and the chemist. When it has served its purpose it can, like mercury or arsenic, or other dangerous remedies, be withdrawn. Ordered, instead of prescribed, as a common drink, the patients become their own doctors and their own destroyers. It is hard enough, as we have seen, so to prescribe alcohol as to prevent evil from it ; to order it without care is to endanger its current utility, and to make the perpetuation of its evils the most imminent of dangers.

On the mode of administering alcohol by prescription a word may be useful. I prescribe .830 alcohol, adding to it usually a little glycerine ; one drachm of glycerine to a half-ounce fluid measure of alcohol and two ounces of water. For those adults who are not accustomed to alcohol, half a fluid ounce in ten ounces of water is a good standard dose. That dose will produce a distinct physiological effect. It will quicken the pulse to two thousand beats, and will cause a preliminary rise of a fourth of a degree of surface temperature. This dose may be repeated every hour for four hours without harm, but not beyond that with impunity.

For ordinary drinkers of alcohol this dose is small. They will take an ounce, or an ounce and a-half at once and not be seriously influenced, and to them in emergency this dose may not be too considerable. Its repetition must, of course, be considered with more care.

THE ART OF EMBALMING.

THE METHOD BY INJECTION.

IN the last number of the ASCLEPIAD a description was supplied of the ancient methods of embalmment, and the various modifications of the art were traced up to the time immediately preceding the labours of the distinguished Dr. William Hunter. Hunter after Ruysch introduced into this country an entirely new system of embalming, that, namely, of carrying out the process by injecting the dead body through the arterial vessels with a preservative solution.

THE METHOD OF RUYSCH.

The credit is usually given to William Hunter of having originally invented the injection method. This is not strictly correct. Hunter did much to make the new plan known, and he also deserves great credit for having practised the plan with remarkable success. The full credit must, however, be attributed to the illustrious anatomist of Holland, Frederic Ruysch. This anatomist whilst filling the chair of anatomy at Amsterdam between the years 1665 and 1717, brought the art of injection of dead bodies to such extreme perfection that his specimens were the wonder of

the age in which he flourished. Amongst other distinguished persons who came to see the work of this anatomist, was Peter the Great, and so struck was that strange monarch with the specimens which were put before him, that it is said he kissed the lips of a child which Ruysch had preserved. So life-like was the face that, at first, the Emperor did not detect that it was the face of a child that was dead.

It is also said that by the method adopted the colour of the body was maintained, with the complete form and suppleness of the limbs, but for what length of time these conditions were present we have no account. As none of the bodies so preserved remain entire, to testify to the perfection of the Ruyschian method, we must, I fear, accept some parts that are declared of it with the usual grain of salt. The inventor died, leaving a wonderful set of injected portions of the body behind, a cabinet of which was bought by Peter the Great and carried to St. Petersburg, and we may perhaps honestly consider him to have been not only the inventor of the plan of treating by injection of preservative fluids, but the most skilful injector who has ever lived. He was selfish enough to depart from the scene of his labours without communicating his secret, whatever it was, to anyone. The improvement he made is, therefore, lost, except in respect to the method of using the preservative by the process of injection.

WILLIAM HUNTER'S METHOD.

William Hunter followed Ruysch in the plan of forcing a preservative fluid into the dead body by the blood vessels. He injected by the arteries, select-

ing generally the large artery in the thigh, the femoral, for the vessel into which to insert the nozzle of the syringe.

The particulars of his plan are rather minute. In the first place, he injected into the crural arteries a solution compounded of oil of turpentine, Venice turpentine, oil of lavender, oil of camomile, and vermilion. This solution was forced into the vessels until it had made its way over the whole of the body, and had produced a general redness of the skin. The body was now allowed to remain for several hours untouched, to permit of the diffusion of the injected fluid completely through its structures. When this part of the process was completed, the operator returned, and proceeded to lay open the body as if he were making a post-mortem examination. The viscera of the chest and abdomen were removed, the fluid in them was squeezed out, their vessels were injected with the preservative solution, and the organs were steeped in camphorated spirits of wine. Then through the aorta more of the preserving fluid was driven, and the cavities of the chest and abdomen were washed with camphorated spirit. The viscera were next replaced, and the intervening spaces were filled up with a powder of camphor, resin, and nitre. The same powder was put into the nostrils, mouth, and other external cavities, and finally the body was rubbed over with the essential oils of rosemary and lavender.

The body thus treated was placed in a coffin upon a bed of dry plaster of Paris, by which all moisture was to be extracted from it. The coffin was closed up for four years, then it was to be opened, and at the end of that time, if the desiccation were not complete, another bed of plaster of Paris was to be

added. "This was the method," says Mr. Pettigrew—in whose book the details will be found at greater length,—“by which the wife of the eccentric Martin van Butchell was embalmed by William Hunter himself.” “The specimen,” Mr. Pettigrew adds (it is still preserved, by the way, in the Hunterian Museum), “resembles a Guanche or Peruvian rather than an Egyptian mummy; and is, properly speaking, a desiccated rather than an embalmed body.”

The formula for Hunter's embalming solution is—Venice turpentine, one fluid pint; oil of lavender, two fluid ounces; oil of rosemary, two fluid ounces; oil of turpentine, five pints.

Hunter's method was afterwards practised by Dr. Matthew Baillie, with this variation, that instead of removing the intestines or other viscera, he (Baillie) injected the preserving fluid into the stomach and rectum, and into the lungs by the windpipe, after he had thrown the solution round the whole of the body by the arteries. A surgeon, named Sheldon, also carried out a similar method, except that he used for his preservative camphor dissolved in spirit, in the proportion of one ounce of camphor to six ounces of spirit, and the success of the experiment was complete. In this case the viscera were removed from the cavities, and were coated with tar. The visceral cavities were also coated with the same. The external surface of the body was covered with a tarred sheet.

In order to comprehend the perfection to which William Hunter attained in the art of preservation, by the process of injection, it is necessary to visit the museum which he has left behind him, and which still remains, in splendid form, in the University of

Glasgow. There are to be found, in that collection, some specimens of preserved faces of children which are still lifelike, and true to the life to a degree quite startling. When I last saw one of them a few years since, it occurred to me that if the parents of the child could look at it even now they would not have the slightest difficulty in recognising it. There is, I believe, no specimen of the kind in existence like to it. The head is divided into two lateral halves, and each half is preserved in a separate jar. The view therefore of the face, on either side, is in profile, but by bringing the two jars close together a fair idea of the appearance of the full face can be obtained. The face resembles that of a boy about four years old and of engaging expression. The lateral view of the brain is remarkably clear, and the medulla oblongata is more sharply defined than in any other specimen that I have ever had under my observation. The colour of the hair as well as of the skin is most natural, the injection seeming to have undergone no deterioration, although the specimen is surrounded by spirit. The colour of the hair, a reddish brown, is also well preserved.

MADDEN'S PROCESS.

The plan originated by William Hunter held its place, with very slight modifications, for several years. Joshua Brookes, the last of the great English anatomists, who had a distinctive school of anatomy of his own, practised this method.

But according to Mr. Pettigrew, Mr. Madden succeeded in bringing home, by sea, from Naples to London, the body of a youth preserved in tar. The voyage, which was long and perilous, lasted seventy-two days.

PROCESS OF M. BOUDET.

The next change of the process was made in France, by M. Boudet, who introduced the use of corrosive sublimate into practice as the preserving agent. This experimentalist followed very closely the method of the ancient Egyptians, only that he employed a different agent for preservation. He laid open the large cavities of the body, incised the viscera, and covered them as well as the walls of the cavities with an alcoholic solution containing bichloride of mercury. After this, he added a layer of varnish, and then filled up the space remaining in the cavities with aromatic powder. He next sewed the incised parts neatly together, and, having varnished the whole of the skin, powdered it with aromatic substance, covered it with several bandages, and over the bandages spread another layer of varnish.

With Boudet the system of simply treating the inner and outer surfaces of the body with the preservative died out altogether. His plan was superseded by the process of Tranchina, who followed Hunter in injecting the arteries, but who employed a different fluid substance for injection.

PROCESSES OF TRANCHINA AND GANNAL.

Tranchina first made use of a substance that had to be heated to become fluid, and which became solid on cooling. After a time he gave up this plan, and simplified it by using a simple solution composed as follows:—Arsenic, 2 lbs.; cinnabar (for colouring), 1 oz.; spirits of wine, 20 lbs., by weight. This solution was injected through an artery until all the tissues were charged with it.

After Tranchina, M. Gannal introduced a solution, to be used in a similar manner. He held the composition of the solution as a secret, but it was soon discovered to contain arsenic. The practice of embalming with these arsenical solutions having become common in France, the Government of Louis Philippe issued an order in 1846, declaring that the sale of arsenic, and of all compositions containing it, was prohibited for soaking grain, for the destruction of insects, and for the *embalming of bodies*. Later, the use of corrosive sublimate was, in like manner, interdicted.

In 1847, Gannal maintaining that his preservative did not contain arsenic, but was a saturated solution of equal parts of sulphate of aluminum and the chloride of the same metal, a Commission of the Academy of Medicine was appointed to inquire into the subject. A solution presented by the inventor was examined, and found to contain arsenic, whereupon it was excluded from public use.

SOME OTHER METHODS.

The injection of sulphurous and carbonic acids into the arteries in the form of vapour—the acids being produced by the quick action of sulphuric acid on charcoal—was suggested by a chemist named Dupré, but the results were not favourable.

Another suggestion was by M. Robiere, who proposed to use rectified wood spirit in which camphor had been dissolved, as the preserving solution. This was clearly a return to the plan that had already been carried out in England by Sheldon, and that it did not prove satisfactory in Robiere's hands is indicated by the fact that he recommended it should be supplemented by the application over the body of a coat of varnish.

When I was making a visit to Paris in the year 1867, I was shown portions of the body of a lady which had been preserved, I was told, by some process which had never been revealed. In this specimen the muscles of the arms and thighs had been dissected out with considerable care, as for anatomical purposes, and they were in a state of remarkable preservation. They were also naturally supple, and yet sufficiently firm to admit of being handled. They felt to the hands greasy, but they left no stain on the skin, nor unpleasant odour. The most objectionable part was that the whole of the structures thus preserved were as black as ebony, and refused, I understood, to receive any colouring principle that would give the idea of natural appearance. I was informed by the exhibitor that the process had been used for embalming, and that from the circumstance of its leaving the whole body supple as well as fresh, it was exceedingly effectual; but that the objection made to the colour prevented its successful introduction into practice. From the general appearances, I came to the conclusion that the secret preservative used in this case was nothing more than sulphuric acid, and I afterwards made some experiments of injecting the vessels of a dead animal with sulphuric acid diluted with water, which showed to me that the supposition was correct. The muscular structure in these instances becomes as if it were partly charred, but it remains quite flexible, owing, I think, to an after absorption of water by the acid from the atmosphere. For the purpose of embalming, this process, as it now stands, is inapplicable, but if by any means the muscles preserved by it could have a fleshy colour communicated to them, it would be an invaluable method for the demonstrator of anatomy, since by

its means he could preserve careful dissections of the natural parts for many years, ready for demonstration.

Simple wood vinegar has been used by some embalmers for injection of the vessels. This application came from an observation made in 1833 by the distinguished chemist Berzelius, who examined a body kept by this means in perfect preservation twenty years.

M. SUCQUET'S PROCESS.

At the time when M. Gannal's process was before the Academy of Medicine, M. Sucquet presented a preservative solution for embalmment that was free of arsenic. It was a solution of chloride of zinc. Experiments were made by the Academy with this solution, and with M. Gannal's sulphide and chloride of aluminum solutions. Two bodies were embalmed, one by Sucquet's, the other by Gannal's process. The bodies were buried for one year and two months, when the one embalmed by M. Gannal had undergone putrefaction, while the one embalmed by M. Sucquet was in perfect preservation. Exposed to the air, the latter dried without the least putrefaction, and acquired a degree of hardness comparable only to that of wood or stone.

Sucquet's method has been most extensively used, both on the Continent of Europe and in America. I have used it several times, and, although it admits of great improvement, it is, on the whole, the best preservative system known for embalming purposes by the process of injection.

FALCONY'S DESICCATING PROCESS.

About thirty years ago an ingenious French experimentalist by the name of Falcony brought out a

mode of preservation which, for the end had in view, was exceedingly useful. Falcony did not aim to preserve the bodies of the dead in their natural state, so that they might be recognizable for a long time after death, but he desired to introduce a perfect temporary plan by which the dead body which could not be immediately buried might be retained near to the living, and yet be, in no sense, a source of danger. In this object he succeeded in a remarkable degree, and by a process so simple that any one could carry it out.

The method is sometimes called the dry process, and consists in placing the body in a bed of dry sawdust, to which common zinc sulphate has been added in powder. That which takes place under these circumstances, is that the body slowly dries up or desiccates. The water of the dead tissues is given up to the zinc sulphate, and from it to the sawdust: then the sawdust yields its moisture to the air, and in a few days the body, without throwing off the slightest odour, becomes like a Peruvian mummy, and, although bereft of all its natural features and appearances, is completely preserved.

The opportunity was afforded me of observing the operation of Falcony's plan, soon after it was introduced. In the Grosvenor Place School of Medicine, to which I was then attached as lecturer on physiology, the method was put to the test in the dissecting room, on the remains of subjects which were waiting to be removed for burial. The results were singularly perfect in so far as the completeness of the preservation was concerned. Since that time I have several times had occasion to recommend the same plan in cases in which it has been necessary to retain the dead an unusually long time before interment, or where the

necessity has existed for conveying the dead a long distance previous to interment.

As it is important for medical men to know how to carry out this plan, it may be well to add that for all ordinary purposes when it may be required it is simply necessary to mix intimately two pounds' weight of common sulphate of zinc in powder with as much sawdust as will suffice to cover the body altogether. If objection be taken to the powder coming into direct contact with the remains, it may be put into fine linen cases or pillows, but it is not then quite so effective. The shell in which the body lies need not be closed in any hurry, but a thick layer of the powder must always intervene between the body and the outer air.

EMBALMING AT THE PRESENT DAY.

Embalming at the present day is, in England, an exceptional process, and when we are called upon to perform it here, it is, in ninety-nine cases out of the hundred, for some one foreign to our country. I have embalmed fifty bodies, but only in two or three instances the bodies of English people, and in these exceptional instances the deceased, although they were born and died in England, had lived the greater part of their lives abroad, and were embalmed in order to be conveyed to friends at a distance, who wished to bury them. In the United States of America the embalming process is carried out to a great extent, and I believe the number of persons embalmed in that country increases every year. Hence, Americans who are residents here often ask to have friends or relations embalmed.

The reasons assigned for embalmment are numerous

—some are valid, some perhaps fanciful. In most cases in which I have been consulted, the object of the embalming has been to retain the body free of putrefactive change long enough for it to be conveyed from the place where it died to some distant place where it is finally to be entombed. This object is in every sense reasonable. In other examples the embalming has been sought for in order that the relatives might retain the dead body as long as they could with the face exposed to view. For such purpose coffins of a special kind have to be made, in the lids of which a pane of glass is placed. In England these receptacles for the dead are not often constructed; but in America they are specially constructed, and I learnt that one body which I embalmed in England was, on its arrival in America, transferred to the particular receptacle described, in which (with the face perfectly preserved) it is retained.

I offer no opinion as to the value of embalming, because the question involved in it is one entirely of feeling. I may only add that the process is harmless to everybody; it involves, I mean, no breach of sanitary rules if it be properly conducted.

Once I knew the embalming requested from the last direct wish of the deceased, who feared unless this precaution were taken she might be buried alive. It was not necessary, of course, to embalm to insure against that terrible calamity, but the desire had to be carried out. The lady was afterwards buried in the usual way.

Embalming is sometimes performed on distinguished persons as a supposed mark of distinction. For ages upon ages this intention has been acted upon, and has become, in a certain sense, a fashion.

Probably, if the distinguished personages who were embalmed with so much care in ancient Egypt could have foreseen to what base uses their preserved remains would in the course of time come—that they would stand, in fact, as the shows of another civilisation—they would have been anxious to have been consigned at once to the earth after their deaths, or even to have been resolved on the pyre. Yet to this intention of embalming there are two sides. To the historian these remains of what once were mighty men possess an interest of no mean character, and he who would wish to trace the correct line of the Pharaohs, regrets, I doubt not, sincerely, that the embalmers of these royal personages were not more successful in their art. It must be admitted, however, that this object of embalming has been abused. To embalm a distinguished man that he may lie for long periods in the embalmer's room to be stared at by multitudes of people as a pseudo-scientific sight, is a degradation of scientific labour.

Occasionally, the art of embalming may prove of service for the benefit of the public—that is to say, for the promotion of public justice. It may be necessary to embalm a body in order that it may afterwards be identified; or it may even be necessary to preserve the whole or parts of a dead body in order that it, or they, may be submitted to analysis or other mode of investigation.

There is yet another object for the public good in which the skill of the embalmer is useful. There are circumstances when it is not possible to bury a body immediately, and where it is necessary to keep it in such a state that it will undergo no decomposition, nor be calculated to be injurious to the living

who are near to it. Here it is of moment to know how temporarily to check the decomposition and prevent the diffusion of poisonous gases from that source.

I have dwelt for a few moments on these details of embalming, without minutely arguing any point that may be raised upon them, in order to show that the art is one that is demanded on various grounds, and is not likely to fall out of demand. As this is the undoubted fact, I think it is right for medical men to retain and even to cultivate the most perfect knowledge of the art. If we do not scientifically carry it out, other men, mere empirics, who know nothing either of chemistry or of anatomy, will attempt to do so, the public will be defrauded, and an art, which really rests on the purest basis of science, will be brought into unmerited disrepute.

There is nothing so difficult in the process, but that any practitioner can perform it as easily as he can perform a post-mortem examination; and when he has before him the simple rules I shall lay down in my next essay, he will find the task easy. One quality only does it call for, and that quality is patience. It is true that in these days we are rapid to a marvel when we compare ourselves with our old friends the Egyptian embalmers, for we require hours where they required days. But still, to do the thing well, some considerable patience is demanded even now, notwithstanding all our modern knowledge and modern appliances.

OPUSCULA PRACTICA.

"There are mites in science as well as in charity."

BENJAMIN RUSH.

METHYLAL, AND ITS USE IN DELIRIUM TREMENS.

THE hypnotic fluid called methylal ($C_3H_8O_2$) has recently been put forward in the medical and scientific journals as a new addition to the list of remedies. This is an entire, and, to speak the plain truth, a not very fair mistake. Methylal was introduced into medicine by myself in the year 1868, and I have directed attention to it and its action many times, more than once in the pages of this work. I have also tested its effects on an extended scale, and published accounts of them from time to time. In brief terms the following are the medicinal qualities of pure methylal.

1. Methylal is hypnotic and antispasmodic.
2. Its action lies between ethylic alcohol and ethylic ether. It may be looked on as a volatile alcohol, and resembles closely pure methylic alcohol in action.
3. It can be administered by inhalation as vapour, by hypodermic injection, and by the mouth in aqueous solution.
4. It reduces arterial tension, and by local action excites glandular activity.

5. The sleep it induces is not profound unless the dose be excessive. It is quickly eliminated, and leaves no serious effects. It causes no vomiting nor stomachic disturbance.

6. A fatal dose by inhalation kills by complete relaxation of the muscular fibres of the heart, leaving the heart distended with blood and the vascular organs intensely congested.

7. It combines with ether, alcohol, amyl nitrite, and many other remedial agents with which it acts in concert, while it equalises their action by reason of its own solubility.

8. Its tendency is to maintain the fluidity of the blood, and it may, therefore, be of service in combination with ammonia.

9. It promises to yield a safe and effective anæsthetic mixture in combination with ether.

10. It reduces the animal temperature, but not to the same degree as common alcohol.

In my experience of methylal as a therapeutic agent, I have very often prescribed it in doses of from one to four drachms, combining it, for the sake of the flavour, with orange flower syrup and adding water in the proportions of methylal 3j, syrup of orange ʒss, water ʒss. Administered in this way by the stomach it possesses hypnotic and antispasmodic properties of considerable value, and its grand service will be in the treatment of spasmodic and painful affections, such as asthma, angina pectoris, colic, and tetanus. Its readiest value will probably consist in its use as a menstruum for other substances of the same therapeutical action. I have used it in this way with nitrite of amyl in the treatment of angina pectoris, and I have administered it from an ingenious inhaler, invented by Mr. Charles Smith,

in which a mixture of methylal and the nitrite (ten parts nitrite, ninety parts methylal) is employed. The vapour given off by this mixture is extremely pleasant. But it is more than pleasant; by the combination the action of the nitrite is less sudden and much more prolonged,—a very considerable advantage. Another good combination is one of methylal with pure anhydrous ethylic ether. As the boiling-points of these two fluids, their vapour densities, and their specific weights are closely allied, and as both contain the same elements, I think they will form an excellent anæsthetic compound, the solubility of their vapours in the blood being considerably greater than when ether is used alone. I have only had one experience of this mixture, but that was extremely favourable.

Recently methylal has been brought forward as a substitute for alcohol in the treatment of delirium tremens. In this way it is used hypodermically, and it is reported to act favourably as an anodyne and hypnotic. If the methylal were pure, the evidence is clear enough that the action of it would be practically the same as that of alcohol itself in proportionate doses.

In a case of inebriety, in which I prescribed it as a substitute for alcohol, its action was so similar that if it had been continued there would simply have been an exchange of symptom from alcoholism to methylalism, a distinction almost without a difference.

One point more calls for observation respecting the use of methylal as a remedy in disease: I refer to the cost of it in its pure state. Methylal can be bought in the market, as it is supplied for commercial purposes, at a low price. But this is not strictly speaking methylal: it is a very impure compound, containing acetone in free quantities; and from the statements

I have lately read regarding the observed effects of what is called methylal, I can come to no other conclusion than that the action of a mixture of acetone and of methylal is described, rather than of methylal alone. At present, as I am advised by one of the very first manufacturing chemists, Mr. John Williams, pure methylal cannot be produced at a less cost than five shillings the fluid ounce, a cost which would render the pure drug quite out of the question as a medicinal agent in practice, seeing that the dose to an adult is from one to four fluid drachms.

The view stated above is further sustained by the fact that the experimental results which I myself obtained from the ordinary methylal were so entirely different from those which followed the effects of a perfectly pure specimen that was made for me by Mr. Williams, that I should not have recognised them as being of the same kind. The impure specimen produced results closely resembling those caused by acetone: the pure specimen those produced by pure ethylic alcohol.

*APPLICATION OF COLD OVER THE REGION OF THE
HEART.*

THE *Bulletin General de Thérapeutique* for January 15th, 1888, contains a communication by Dr. Walter in regard to some observations made in the clinique of Menassein on the effects of applying cold to the region of the heart for the reduction of pyrexia. The cold was applied by means of the ordinary ice-bag, and does not appear to have exerted any very marked reduction of temperature generally, but at the point where the

ice was applied the temperature was much lowered. The most important fact was that the character of the pulse was changed; the systolic impulse was at first lessened, but, after a time, it was greatly increased in force. When the ice was removed, the original quality of the pulse, as it was at the commencement of the application, returned. Walter has used ice over the cardiac region in the manner described in cases of pneumonia during periods of pyrexia, and with success in restoring the balance of the pulse; but there is one statement which is so different from my own observation that it strikes me with surprise. He speaks of leaving the ice on the skin for periods of from twenty-four to forty-eight hours. This must mean that the ice was left in such a manner that it easily melted, and then ceased to yield the low temperature of ice-cold, a matter very different to the action of ice-cold water in current. Ice-cold water applied in current through Leiter's metal tubes sustains such a steady cold that it has to be watched with care in order to be sure that the skin is not too severely chilled.

The note of Walter raises again the question of the best region to which to apply cold locally for the reduction of pyrexia. I originally chose the forepart of the neck. I have, however, in some instances tried the effect of applying the cold to the abdominal region, and with a satisfactory result. A large but light metal coil answers well for this purpose, the effect is rapid and decisive, and when there is peritoneal pain, the cold, applied in the manner indicated, performs a double intention of usefulness—it reduces the pyrexia in the most direct way, and by the local anæsthesia it produces it immediately relieves the pain. On the whole, however, it seems still the best practice to use

the neck collar for producing a general reduction of fever in all uncomplicated febrile conditions; but in cases where there is local pain it is perhaps most advisable to make the part where the pain is felt that to which the cold is to be immediately directed.

The four leading practical facts in respect to the use and application of local cold in pyrexia are—

1. That cold locally applied can be made to bring down febrile heat.

2. That as an antipyretic cold merely acts temporarily, and does not remove the prime cause of the fever.

3. That it can be employed to relieve pain at the same time as it is being employed to reduce pyrexia.

4. That the best mode of using it is by the Leiter tubes, with ice water in current.

THE EAST WIND AND DISEASE.

NOTHING adds more to the depression of some classes of disease than a long-continued and bitter east wind. An east wind is often a cold wind, but it is not the cold that is the enemy. An east wind is usually a dry wind, but the dryness is not the enemy. It is a something quite specific in the east wind which gives to it its invariable bad quality.

The east wind seems to me to affect unfavourably every disease, acute and chronic, but some diseases are more unfavourably influenced by it than others. I notice that all nervous conditions in which, for want of a more correct term, we say the nervous tone is lowered, are much intensified by the east wind, and, indeed, the special action of this particular wind is to produce want

of tone or debility. Under its influence almost all sick persons say they are depressed; they do not complain of reduced appetite, nor of pain intensified, nor of derangement of the secretions, but they declare that they are rendered prostrate both in mind and body. They are also more irritable in mind, which perhaps leads them to feel acutely the sense of prostration. In brief, if a single word were wanted to express the morbid effect of an east wind on the sick man, and on all the members of the sick community, that word would be *prostration*.

That the presence of the east wind increases the mortality of those who are suffering from diseases of debility of every kind is a fact that seems undoubted. The physician through the whole of the spell of an east wind will find his patients complaining of not making satisfactory progress, and will see extreme cases rendered more speedily hopeless,—facts indicating the existence of a general and all-pervading influence in the atmospheric sea itself as the cause of the whole of the evil. What that influence is, how the air is modified, whether it is modified by some change in the constitution of the oxygen, or whether it carries with it some foreign deleterious product, it is impossible to say, for up to this time no special chemical examination of the east wind has been made with the object of determining its special physical properties. We know the effects of it, and we know no more.

During the presence of an east wind increased care is demanded in the treatment of disease. The sick-room should always be kept up to 64° Fahr., and good nourishing food, without stimulants, should be regularly supplied. It is quite true that warmth does not altogether counteract the influence of the wind, for a warm east

wind has often almost as depressing an effect as a cold one; but still a warm air in the sick-room is necessary. I think also that something useful from medicines may be obtained. It is a common practice with me to administer decoction of bark or quinine rather freely when they can be borne—and they usually can be well borne—during the depression incident to the east wind.

It is a common impression that colds and bronchial affections are more easily contracted during an easterly than during any other wind. I am not prepared to endorse that view. Cold damp winds *not easterly* are infinitely more treacherous in this particular. The east wind adds greatly to the depression of a cold, but it does not extensively propagate colds. To be strictly fair even to an east, wind, I have known a few persons who have declared that they enjoy better health and spirits under it than under any other condition of the air. For my own part I cannot say that it ever did me any harm. But this experience is exceptional, and the exception proves the rule.



*RECURRENCE OF SYMPTOMS OF CHRONIC SYPHILIS FROM
VENEREAL EXCESS WITHOUT RE-INFECTION.*



A PATIENT who was under my care for acute syphilis fifteen years ago, and who seemed to have made a perfect recovery, consulted me during the past quarter for an outbreak of fresh symptoms decidedly syphilitic in character. He had sore throat of the usual specific kind, syphilitic pains, and a general copper-coloured rash. Interrogated as to the origin of these symptoms, he assured me that he had not been exposed to any new source of infection, and that from the time of his acute attack he

had led a perfectly chaste life ; but two months ago he had married a lady of unexceptionable virtue, and since his marriage had possibly been given to excessive venereal gratification. There was no reason to doubt a word of these statements. A course of treatment, consisting, medicinally, of potassium iodide, and, generally, of change of air and scene, with entire abstinence from venereal excitement, was attended, in a few weeks, with complete recovery from all the specific symptoms.

This case recalls to me several others of a similar kind. In one of these the patient has three times been subjected to the recurrent symptoms incident to an attack of acute syphilis, after venereal excess without any probability of re-infection, and in the other examples the phenomena are quite as clear and unmistakable.

The explanation of the facts seems to me to be that, after the apparent recovery from the acute attack, there is left behind a *specific neurasthenia*, which disposes to a chronic recurrence of the symptoms, in a modified form, whenever there is exhaustion from venereal excess. Other causes of exhaustion may perhaps bring out the same results, but this cause appears to be truly specific, and to lead to a condition of disease from which there is no chance of recovery until entire abstinence from the cause of it has been removed.

It may be well to name the fact that in one of the examples of this character that was under my care, medico-legal proceedings would have been entered upon but for the persistent explanation that the cause of the symptoms was specific neurasthenia, and not re-infection by a woman—a young wife—who was as innocent of fault as any one of her sex could be. At first the affected husband declared that he had never suffered from the primary disease ; but, bound at last to admit

that fact, he subsequently admitted, further, that he had even suffered from an attack similar to that under which he was then suffering, in consequence of what he now was taught to recognise as the true active agency, namely, nervous prostration incident to venereal excess.

GROCERS PALMAR PSORIASIS.

ROCERS while actively engaged in their business are subject to an eruption on the palms of their hands, to which the name of chronic or subacute psoriasis may be applied. The affection is not usually sufficiently active to incapacitate them from work, but it is an annoyance, and, as one of them said to me in consulting me about it, "It is not good for trade, Sir;" by which he meant that the appearance of the affected hands was not pleasant to customers. The affection, purely local, presents, in addition to a scaly outline, marks of dry fissures or cracks, which run in the natural furrows or lines of the hand. So local is the mischief that the right hand is more frequently affected than the left, from the circumstance that it is more frequently used.

Grocers themselves believe that the cause of this local disease is the contact of the skin of the hand with sugar and with saccharine substances. In damp weather the symptoms are often exaggerated, and when the moist particles of sugar get into the fissures, there is some considerable pain or smarting, which is relieved by ablution in warm water.

It is not every grocer that suffers. A grocer who has been long engaged in the trade, and who, from having

been always more or less affected, has observed on the matter with some care, informs me that about three in five escape it altogether. It may be therefore that a certain degree of natural tendency is required in order to elicit the symptom, a suspicion which is well sustained by the fact that they who are disposed hereditarily to psoriasis are much more severely affected than others.

The treatment of, this form of psoriasis is extremely simple. As a rule, the mere act of removal from the occupation for a few weeks is of itself sufficient to restore the natural conditions. In cases where medicinal treatment is also required, I prescribe arsenic with tincture of *nux vomica*, in combination with liquid *taraxacum*, and with good results. Local treatment is all but impossible so long as the patient is at his business, but in cases in which the symptoms are so declared as to prevent work, the external application of a calamine lotion, with lime water, forms an excellent adjunct.

EXPIRATORY DYSPNŒA.

CARCELY sufficient attention, perhaps, has been paid to the phenomenon in disease of expiratory as distinct from inspiratory dyspnœa.

The two kinds of dyspnœa are quite distinct symptomatically ; they, probably, are of very different origin, and they certainly call for a different treatment. Patients sometimes detect these facts for themselves. I have a patient who has, at times, consulted me for over twenty years, and who always says, when he sees me taking up the pen to prescribe for him, "You won't forget, Doctor, that my difficulty of breathing is always in putting the breath out, never

in drawing it in." In this observation he is quite correct; his power to fill his chest with air is perfectly unimpeded and capacious; but when he has filled the chest he cannot freely empty it, and the process of emptying gives rise to wheezing, and to an oppression which amounts almost to pain.

In cases such as are described under this head, the stethoscopic signs are very characteristic. During inspiration the air is heard to enter the chest with perfect facility. There is no spasmodic obstruction, no bronchial whistle or coo, and not, of necessity, the least *râle*. But so soon as the expiration commences, then the whole character of the sounds is changed. The breathing is heard to be stridulous, and the indications of bronchial obstruction are presented.

These cases are not acute or febrile in their nature, and they commonly rank as examples of asthma. They differ from ordinary dyspnoea in that the paroxysm usually induced by the presence of warm air, or by moisture of the air, or by repose of the body in one position, is rarely ever induced by cold or dry air, or by exercise. The affection is rarely accompanied by heart affection, and is nearly always connected with an hereditary predisposition to the same particular form of breathlessness. Whether we ought to call all cases of expiratory dyspnoea "asthmatic," in accordance with the old system, seems to me doubtful, since expiratory dyspnoea may exist apart from the group of symptoms which, taken together, characterise asthma as a distinct affection.



Ioannes Baptista Morgagnus

Patauii Idibus Aprilis MDCCXXVIII.

*Portrait by A. Blotkney. sen. Padua. no. 662001.
Facsimile Autograph from Archives of the
Royal Society. B.M.*

Asclepiad no 19. Vol. 5.

London May, 1898.

THE
JOURNAL
OF
THE
ROYAL ANTHROPOLOGICAL INSTITUTE
OF GREAT BRITAIN AND IRELAND
VOLUME 31
PART 1
1901

Published by the Royal Anthropological Institute of Great Britain and Ireland
21, BEDFORD SQUARE, LONDON, W.C.1
Printed by the Royal Anthropological Institute of Great Britain and Ireland
21, BEDFORD SQUARE, LONDON, W.C.1



*JOHN BAPTIST MORGAGNI, M.D., F.R.S.,
AND THE BIRTH OF PATHOLOGY.*

IN the early years of the seventeenth century, medicine as a science and an art had made the greatest advances she had ever made in the departments of anatomy and physiology.

If the whole of her previous work, through all the ages, were put together in reference to these fundamental studies, it would probably be found that more had been advanced and taught in the fifteenth and sixteenth centuries than in the whole of the previous recorded history of the ages that preceded.

By this time there had been four great lights in true medical science. Mondinus had led the way in anatomy. He had broken through the superstition that prevented the act of "rifling," as it was said, "the bodies of the dead." He had even dissected the body of a woman, and in a work of singular distinction for its day had laid the foundations of anatomy. Mondinus had been followed by Vesalius, whose illustrious, chequered, and sad final career has already been recorded in these pages.

On the foundations laid by Mondinus, Vesalius erected the noble and stately pile of anatomical learning which stands to this hour, and will ever

stand, as the work of a student of nature who drew from herself, and whose exactitude is as clear and as definite as her own.

The next grand exponent of the elements of scientific medicine was our English Harvey, who, retraversing the work of Vesalius, discovered with the keen eye of genius the animal machine in motion, and who did for the dynamical theory of vitality what his immortal predecessor had done for the statical. By these two remarkable men the body was discovered as a mechanism. The physical side of life became a distinct and recognized study, from which there has been no decline, and from which medicine has been developed in a manner as daring in project as it has been useful in application.

Mondinus, Vesalius, and Harvey were followed by one who combined the genius and the industry of them all, and who added to their talents that of a knowledge and appreciation of psychology. This succeeding pioneer was the illustrious Thomas Willis, known mostly by his immortal work "*De Anima Brutorum*." It will be an early and delightful task to place a picture of Willis on these pages. Suffice it now to say that he supplemented what had been done by his predecessors with a series of researches on the nervous system that must remain as master works so long as the history of science itself remains.

The anatomical and the physiological sides of medicine were, by these great scholars, and by others, very little inferior to them, and also very great, fairly brought before the world ; but there remained a branch of medicine of the supremest moment still uncultivated. This was the branch of Pathology. It had not been forgotten, for Harvey himself had seen its vast im-

portance, and in his lost and almost his last labours had composed a work upon it which, alas! never saw the light. Pathology was neglected, perhaps by necessity rather than intention, and therewith waited for its man to develop it.

The man who came to do the work that was wanted was he whose honoured name stands at the head of this chapter of great men in Medicine, John Baptist Morgagni.

Like so many of the great lights of learning of the later renaissance, Morgagni belonged to the Italian school. . All through his long and industrious life he was favourably circumstanced. Like many illustrious men, he was the son of a mother who possessed a remarkable understanding. Her maiden name was Marie Tornielli, and she had the misfortune to lose her husband, the father of Morgagni, whilst her boy was yet a mere child. Bearing this great loss bravely, the widow devoted her life and talents to the education of this gifted son, John Baptist, and her care had indeed its reward.

John Baptist Morgagni was born on February 25th, in the year 1682. His birthplace was Forli in Romagna, the capital of a little Papal State lying at the foot of the Apennines, and to the south-east of Bologna. The place was famous for its beauty, and for containing a palace built after the designs of Michael Angelo. It was a place very small for a city, but favourable for the development of intelligence, being supplied with a good library, schools, and a college.

After passing through the elementary studies common to his time, Morgagni proceeded, at the age of fifteen years, to Bologna, and commenced at once to

enter medicine as a student of two of the most celebrated professors of the age, namely, Albertini and the renowned Valsalva. In this happy position the enthusiastic student made his mark and his way with singular success. Valsalva was at this time in the zenith of his brilliant career as an anatomist; he was constructing the immortal work on the organ of hearing, which gave to the world the first true insights into the details of the most wonderful piece of animal mechanism that exists in the animal body. The work was minute, and opened, as it progressed, the richest of discoveries and the very labyrinth of mysteries.

A good and youthful pupil was just what the illustrious anatomist required at that particular moment, and there was probably in all Italy not one who was better fitted for the responsible post than Morgagni, who entered into the work before him not only with enthusiasm, but with the steady industry and perseverance which afterwards signalized his whole career. In the public lecture theatre, as well as in the private dissecting-room, the young man laboured with assiduous care, and nearly all the dissections of the ear which the master (Valsalva) required for his demonstrations, or for his illustrations, were, under his own supervision, carried out by his pupil.

In the year 1701 the student entered into real professional status by taking a degree in his university of Doctor of Medicine and of Philosophy,—a happy combination of qualifications which might, with much advantage, be restored at the present day, when so much of medicine and so little of philosophy is demanded of the student to the manifest injury of both departments of knowledge. Happily, too, the evil genius of cram was no blight on the good genius of the rising

scholar : there was nothing to wear out his mental powers before they were half developed. He was permitted to grow into healthy manhood of mind as well as body.

In the absence of Valsalva, the pupil was soon able to take the place of the master in the professorial chair, and in his twenty-third year he undertook the duty of president of an independent school or academy, which went on for a time, and then, for some reason which has never been explained, ceased to exist, or, as one of the biographers expresses it, "became forgotten." He tried to fill the new society with his own industry and his own ardour, but in a first effort, wanting in experience of the world and its ways, he failed. That is the long and the short of the whole transaction.

It could not, however, be expected that a will like that of Morgagni would be defeated by a single and a first failure ; on the contrary, it stimulated him to fresh efforts, and so we see him leaving the scenes of his early labours in order to visit the great schools of science in Venice and Padua, so as to obtain a more intimate acquaintance with the details of the various parts which make up the proper curriculum of a completed medical career.

Up to this time the health of our student had not been so good as could have been desired. His severe application to work reduced his physical powers, and he suffered from some affection of the eyes, which forced him to give up his new studies for a season and return home in order to recruit and rest. The malady, whatever it was, seems soon to have passed away, for in the year 1715 we find him elevated to the chair of anatomy at Padua, in succession to Professor Guglielmini. Morgagni now held one of the highest places in the

world as a medical teacher, and his reputation was secured.

In the days when Morgagni lived the position of a professor of the healing art in any one of the great departments of medicine was singularly exalted. The professor was the man of the time: every one looked up to him with respect, and the students who followed him looked up to him with actual reverence. The position was well earned, for the art of teaching in those happy days was an art not more important than it is now when conscientiously carried out, but an art which brought its own reward, and one to which the whole mind and energy of the man was directed, without let or hindrance.

The position secured for Morgagni at the opening period of his life was unusually fortunate for him and his career. It was fortunate also that the pursuit to which his life was devoted was in every sense congenial; there was nothing in it of any kind that savoured of labour, for he knew no labour. Of all the masters of physic whose lives I have read, not one seems to me so happy as that of Morgagni, in whose whole history there is but one record of a serious dispute with any adversary, and this terminated to his credit and victory both as a genial, honest gentleman and as a sound scholar.

The rival with whom he crossed swords in this single instance was one Jean Jacques Manget, a Swiss, who, originally intended for the Church, changed his course, passed over to medicine, and commenced to practise in Geneva, the place where he was born, and in which he flourished during a very long life. Manget was a hard worker in medicine. He was popular as a practitioner, and was a most laborious compiler of

treatises on medicine, anatomy, and surgery,—a bibliothetique of the most lavish quality. With the labour of the compiler this scholar combined, as is very often the case, a timid jealousy of men who, by natural parts and genius, surpassed him in originality of research and in comprehension of natural phenomena. To Morgagni he was a weak antagonist, troublesome as such little persons always are, but at no time a source of danger, and at all times easily put down if the labour of putting down be worth the effort.

Morgagni did once think the effort worth making, and was quickly the dignified conqueror.

Anatomy was the first and original study of our present master, and through all his life it was that part of science which he liked best and followed most devotedly. He added the accomplishment of completeness to many of the anatomical researches which previous to his time had been carried out by the great pioneers of the world of science to whom we are so deeply indebted. In this manner he revised anatomy, and corrected many of the minor errors into which his predecessors had inadvertently and almost necessarily fallen, and had he lived for no other purpose, he would have exhibited a brilliant and useful career. But he was destined to do more than correct the errors of his anatomical forefathers. He founded and he carried out a new branch of medical learning.

This new branch was Pathological Anatomy.

It is necessary, in studying the new work of Morgagni, to be exact as to the nature of it. It was not morbid anatomy simply; it was not pathology simply,—it was strictly pathological anatomy. It is a curious fact that it should have been so, but the fact remains incontestable. It might be supposed that, in looking up the

history of medicine from the point of its history when it began to recline on anatomy as its foundation, there would have been indications of a gradual step on and on, from ordinary anatomy to morbid anatomy, in mere descriptive form, without reference to the phenomena of disease which accompany morbid aberrations. Then it might be expected that an investigation of symptoms incident to morbid changes would be noted; and, finally, that there would be established upon these foundations of knowledge a true science of pathology. As the line of progress made its way in this particular department the course of it ran differently, and for the sole reason that the man who at the particular juncture directed the course was a man whose genius led him to connect the external signs of disease with the changes of an anatomical nature that were going on in the seats of the disease. So the world of medicine and of science gained possession of the immortal book with which the name of Jean Baptist Morgagni will ever be connected, "The Seats and Causes of Disease."

I do not, I trust, in this estimate of my present scholar, do any injustice to some who preceded him, or to others who were his cotemporaries. Nothing could be further from my intention. My late much-respected and venerable colleague, Dr. William Cooke of Tower Hill, who, so far back as the year 1822, made an admirable abstract of the most important work of Morgagni, was of opinion that the distinguished Theophilus Bonetus ought to be accepted as the forerunner, and in some respects the master, of Morgagni, and that Lieutaud, Ruysch, and Baron Haller deserve to hold a place close by his side. It would be most unjust not to give to each and all of these men their proper meed of praise, and it would be unjust to deny Bonetus the well-

won credit which Morgagni himself was ever anxious to give to him, in the statement that the famous "*Sepulchretum Anatomicum*" of Bonetus was the great storehouse of learning on the subject of diseased conditions of the body, from which the later and greater work took its origin. But Bonetus was a scholar without being a master, and herein lies the broad difference betwixt him and Morgagni—a wide distinction.

There was one other influence which largely assisted Morgagni in his early career, and which must not pass unnoticed. He was the pupil and intimate friend of one as great as himself, Valsalva. Valsalva had learned under Malpighi, and when that pre-eminent anatomist went to Parma on a visit had filled his place. From Valsalva, Morgagni learned the art of the teacher, and from him he also learned the study of practical medicine. It is matter of constant observation, whilst reading the "*Seats and Causes*," to find the pupil, even in the latest years of his life, speaking of his master and his master's work. "This case was under the care of Valsalva," "This was the observation of Valsalva," and so on, page after page.

THE ORIGINAL WORK OF MORGAGNI.

As a literary worker Morgagni commenced at a very early age, and continued until a very late one. He issued his first essays, the earliest section of the "*Adversaria Anatomica*," in his twenty-fifth year; he issued his grandest treatise, the "*Seats and Causes*," in his eighty-third year. He began, that is to say, to publish in the year 1704, and he finished in the year 1762-3, an interval of sixty-nine years, the longest I have been able to trace in all the histories of medical men of literary name and fame.

Between these two extreme periods he wrote several other works. The "*Adversaria Anatomica*" was extended from time to time until it reached five volumes, and recorded so many new and important facts in anatomy that it became one of the choicest books of its kind in the world of science, and gained for its author the admission to the leading societies of Europe. Our own Royal Society elected him a Fellow in 1724. The Academy of Sciences of Paris paid him the same honour in 1731, the Imperial Academy of St. Petersburg in 1735, and the Academy of Berlin in 1754. In brief, the fame of Morgagni resounded in every country where medical science was studied and practised. He was read and followed generally; but it may fairly be doubted if his reputation would have passed beyond his own age had he not sent himself down to posterity bearing the one work of his life, the "*Seats and Causes of Disease*." This, therefore, must be the work calling for the principal share of our attention.

How this book came to see the light is told by the author of it himself in the introduction or preface. While he was paying a visit away from Padua he met with a student, whose manner, learning, and love of scientific research very much charmed him. This student—who, by the way, does not seem to have been a student of physic merely—was on his side so captivated with what he heard the master of physic tell respecting his observations about the sick, and about the causes of disease, that he was fain to induce the master to send him a series of epistles conveying, in writing, that which had fallen from him in speech, with such additions as might occur during the time that the composition was in progress. The request was accepted, and, after the promised letters were composed and

despatched, they were sent back to Morgagni in order that they might be revised and prepared for press. By this means one of the most remarkable books in all medicine was given to the world.

The famous epistles were made up of matters originally derived from the widest and most prolonged experience, not only of disease, but of men and things. They also included the facts and observations of many other men than Morgagni himself. He constantly quotes Valsalva, Bonetus, Wepfer, Vallisneri, Lansici, Haller, and many others, including Boerhaave and our own Richard Mead. To the whole of the authors whom he quotes he is just and courteous, but of them all his revered Valsalva holds the first place.

To this day no medical scholar can help being delighted and instructed by the study of this wonderful book. To move into it from the midst of the body of current medical literature is like passing from the periodical flux of current general literature to the perusal of the "Pilgrim's Progress," a Shakespearian drama, or "Paradise Lost." It is a transition from the mediocrity of incessant repetition of well-known truths told in long and hackneyed terms, back to descriptions derived direct from nature and fresh from her treasury. It matters not where the book is opened, it is always good and instructive reading, full of suggestion, and rich in original narrative.

I open the book itself quite at random to prove the truth of this statement.

NOTES ON APOPLEXY, AND ON AIR IN THE VEINS.

The illustration that has been alighted on is on a case of apoplexy. According to his simple and effective manner, Morgagni begins by telling out the facts which

relate to the symptoms. He then passes to the consideration of the causes of the symptoms, including the account of the dissections and the lesions that have been detected. Finally, he draws the conclusions which are deducible from the accumulated facts, and adds various suggestions, theoretical or practical, that may promise to be of service or to throw light on any peculiar difficulty.

In the case to which reference is now made a woman, brought into the hospital to which Morgagni was connected, died of apoplexy within two days. She manifested no sense of feeling nor power of motion. On dissection some ovarian mischief was found, but the chief lesion was seated in the brain. The choroid plexus was turgid with blood, and there was a small quantity of water in the lateral ventricles, but there was no organic change discoverable in the cranial viscera.

The recital of facts is short enough, but sufficient to open up quite a new line of thought, and to afford the opportunity of raising various physiological questions bearing on the causes which gave rise to the phenomena.

The particular point which the subject here being considered opened up was the degree of compression which the brain can bear before symptoms of compression are manifested. Touching this point, Morgagni opines that there is a very great difference in effect according to the part of the brain to which the pressure is applied. If the pressure be localized, so that a small part only of the brain be acted on, the effect will, he thinks, be limited or localized, the effect becoming demonstrable in special symptoms; but if the pressure be upon the whole circumference of the

brain, or if it be applied internally in such a manner as to affect the entire mass of the brain, then the result will be general, and will involve the whole of the body, as it did in the illustration on which the remarks were founded.

In further exposition of this argument, Morgagni proceeds to add an observation of Poupart's, relating to a woman, one-half of whose skull was deficient, and in whom, if the dura mater were ever so lightly touched, uneasiness was produced, and an immense number of little torches seemed to be lighted within or before the eyes.

Morgagni also expresses in this commentary, that whatever tends to cause an obstruction of the aorta, tends also to produce excessive determination of blood to the brain. He has seen this to occur in instances in which the aorta has been pressed on by a curvature of the spine, and from tumours impinging upon the abdominal part of that great vessel. Once he observed that the lateral branch of the left carotid artery was ruptured owing to the cause named, the aorta being compressed by an aneurismal tumour connected with the kidney, and causing, by pressure, paralysis of the right side of the body.

I do not remember any point relating to the effects of compression of the aorta at a distance from the arch that is of more importance than this observation. The reasoning seems to be that, if the column of blood through the main trunk of the aorta be compressed, then, as in anastomosis after an artery is tied, there will be a greater volume of blood thrown upon the other parts of the arterial circuit, and so there will be some pressure of blood upon the brain. The fact is so, as I myself have seen in quite a recent observa-

tion of a case in which the abdominal aorta was compressed by an aneurism of the coeliac axis. The symptoms of disturbed cerebral circulation, the signs of sparks and flashes, which the patient complained of as frequently passing before his eyes, were singularly diagnostic when read by Morgagni's exposition, but which, in the absence of that exposition, were very obscure, and were a diagnostic puzzle to my learned friends concerned in the case as well as to myself.

One other excellent observation from this shrewd master of diagnosis, in his commentary upon the subject of pressure on the brain, relates to practice. It is bad practice, he says, to try to carry on intense study while the body is in a recumbent position; and he further adds, that in persons who are disposed to apoplexy there is often experienced a peculiar glow or degree of health a little time before the occurrence of the seizure, the brisker circulation incident to the sensation of good health being the actual cause of a pressure sufficient to lead to rupture of a weak cerebral vessel, or to effusion of fluid within the cranial cavity.

In another example of apoplexy, Morgagni attributes the affection to air in the vessels of the brain. The patient, an Ethiopian about thirty years of age, died suddenly from apoplexy whilst standing to play on the trumpet. He died at the moment when he fell.

Sanctorini made the post mortem, requesting Morgagni to be present. There was rather a deficiency of blood in the sinuses, but wherever blood was found, throughout the body, it was in a fluid state. The vessels which passed over the corpus callosum, and those upon the upper surface of the brain and the basillary artery, were distended with air, but no bubbles

were discovered in other vessels except those of the brain.

Morgagni takes occasion here to descant on the effect of the generation of air in the veins, and from what he tells us in relation to this subject we learn that the first experiments made to determine the effect of the introduction of air and other gases into the vessels were carried out by Wepfer and by some others of his time. It was found in these first experiments that if very little air were thrown into the veins of the lower animals the distress produced passed away after a time, and the animals recovered; but if a free quantity were forced in, then death followed. Animals as large as oxen were killed in this way, the death being always preceded by convulsive movements, and sometimes by opisthotonos.

Morgagni cautiously draws the inference that in some conditions of disease there may be a separation of air in the veins from decomposition of the blood, and that death may be the consequence of such separation.

APOPLEXY FROM VIOLENT SNEEZING.

In another page of the volume in hand there is a chapter of curious interest on a case in which a gentleman forty years of age was teased with violent sneezing at different periods. He was a bit of a Bacchanalian, and suffered from dyspnoea on climbing steps or a height. Excited one day by repeated convulsive attacks of sneezing, he was seized with dyspnoea and sense of constriction of the chest. Under this oppression he sneezed again, and suddenly died.

From the dissection Morgagni was of opinion that the cause of death was congestive apoplexy, and he is led by the facts presented to him to speculate on the reason why the Schneiderian membrane, when it is

irritated, should draw the diaphragm into sympathetic action. Up to his time anatomists had affirmed that there is no connection between the first pair of nerves—the olfactory—and the phrenic, which is a cervical nerve. But, he adds, they forget the nerves which are transmitted from the fifth pair to the membrane of the nostril, and from which pair Meckel traced also a small branch on each side quite to the intercostals. By this mode of nervous communication he explains the sympathy between the olfactory and the diaphragm, and between the same nerve and the abdominal viscera.

In a further note Morgagni remarks on the sympathetic relationship which exists between the Schneiderian membrane and the abdominal viscera, from the symptoms presented to him in a young nobleman about whom he was consulted. This patient was subject to seizures of an epileptic nature, which always seemed to be caused by some derangement in the hypochondriac region, and which were preceded by the sense of a foetid odour, that was extremely annoying to this patient himself, but could not be detected by any one objectively, even when the observer was intentionally inhaling his breath. Hence Morgagni supposes that the irritation in the hypochondria, propagated through the intercostal nerves and by the nerves of Meckel to the nostrils, excited an action in the olfactory nerves similar to that caused by the effluvia of a foetid substance.

PNEUMO-PARESIS.

I find in another page the record of a disease attended by symptoms resembling those to designate which I have quite recently invented the term *Pneumo-paresis*. The patient in this instance was the distinguished Vallisneri, the friend and once colleague of Morgagni.

There was a mild epidemic of catarrhal fever in January 1730, and Vallisneri was seized with it on the twelfth of the month. He was sixty-nine years of age at the time, but the attack was so mild that when Morgagni on the fourth day called on him he found him convalescent, and congratulated him on his recovery, for he was sitting up in bed, and his countenance, voice, and general condition seemed to be the same as in health. On the next day he had still further improved; but on the day following he was very much changed for the worse. His face was dark, his mind dejected, his breathing difficult, his voice weak, and coming as if from a cavern. In spite of these symptoms the patient thought himself none the worse, and he was free of pain. Morgagni intended to conceal his anxiety, but his face betrayed him. The pulse of Vallisneri was slow, and he told Morgagni that from the age of sixty it had been intermittent, but that during his illness it had been regular in its action. Within twenty-four hours Vallisneri expired.

A POINT OF PRACTICE FOR PRÆCORDIAL PAIN.

In cases of præcordial pain, Morgagni was accustomed to order the patient to immerse the arm of the affected side in hot water, which plan, in some of his experiences, gave, he says, such immediate relief that one patient derived nearly as much felicity from it as if he had been emancipated from instant death. In cases where there existed an insurmountable organic disease, an astonishing degree of relief was obtained by this simple process.

HEART DISEASE FROM ALCOHOL.

Morgagni was well aware of the dangerous influence of alcohol on the action of the heart, even when the

heart itself does not give any indications of organic change. Through the nerves he thinks that the heart may be thrown into excessive action owing to reflected causes seated in other organs. In illustration he relates the case of a man who was brought into the hospital of St. Mary de Morte, at Bologna,—to which he was attached,—suffering from swooning and difficulty of breathing whenever he attempted to sleep, and who suffered also from pain in his right arm as if the arm were being torn in pieces. In this man pulsation extended from the region of the heart to the region of the umbilicus. The pulsation was perceptible to the eye, and although it was most marked in the thorax, yet in the abdomen, near the umbilicus, it was so violent that when the hand was laid over the spot it was struck forcibly, leading to the inference that an abdominal as well as a thoracic aneurism existed. The patient himself felt the pulsation everywhere, even to the extremities of his toes. The carotid, the temporal, and the radial arteries were agitated by strong pulsations, and the feet were somewhat swollen.

The patient took scarcely any food, and was almost free of pain. After being four days in the hospital he expired during a fit of the dyspnœa.

At the post-mortem, which Morgagni carried out, he was much surprised to find so little organic mischief in the organs of the circulation. The heart was large, and in the course of the aorta from the heart to the bifurcation of the iliacs there were slight unequal sulci running longitudinally. But there was no aneurism and no dilatation. The colon was contracted into narrow cells; the stomach was much contracted, but this might be accounted for by the fact that the man had taken no food for several days; and the liver was

hard, and marked with spots on its surface like a kind of small granules.

The commentary made by the master in this instance is most instructive, and indicates how keen was his appreciation of the causes of disease. The one cause of the symptoms in this patient was that of drinking wine in excess, and the vehement action of the heart and arteries arose, undoubtedly, from the same cause as that from which it arises in most persons during the incipency of aortic aneurism, namely, the influence of the nervous system on the action of the heart and great blood-vessels. Nothing tends more to induce this excessive action than a stimulant plan of diet. "In persons addicted to drinking," he adds, "I have known this to occur several times, and in all of them I believe the extreme pulsation was owing to the influence of the nerves, as there were no particular indications of other diseases, or, if there were, they sustained an intimate communication with the nervous system." When the heart is flaccid, he asks, how can it occasion a full and strong pulse, except through the influence of the brain and nerves?

According to Morgagni, aneurisms do not begin in the vessels from laxity of the membranes, injury, or ulceration, but from powerful action of the heart and arteries. The first lesion of the heart which discovers itself is the appearance of sulci on the inner coat. After this, other injuries follow in the next coat earlier or later, in proportion to the impetus of the blood. From these facts he infers that much can be done in the early stages to arrest the progress of aneurism, by strict attention to matters of diet and regimen.

INFLUENCE OF THE MIND ON THE CIRCULATION.

Morgagni paid great attention to the subject of the influence of the mind on the circulation. He maintained that under certain passions of the mind, the course of the blood through the lungs is often powerfully excited, and sometimes is as powerfully retarded. We cannot therefore, he says, be surprised if from violent efforts to suppress or conceal indignation aneurisms of the heart and the aorta should originate. Such is the power of the human passions in dilating the channels and receptacles of the blood, that Albertini justly deduced an argument from the absence of this influence in brutes, to account for these dilatations being rarely found in animals of the lower kingdom of life.

Respecting the seat of aneurism, he was of the opinion that at the curvature of the aorta, or very near it, aneurism of this vessel is most usually situated. The blood is driven into this part with greater impetus, and is, proportionately, repelled by the curve when the vessel contracts. But the blood is more easily received into the descending aorta than into the ascending, because it is shorter, has no branches, and is closed by the semilunar valves. Therefore aneurismal dilatations are more liable to happen between the curvature and the heart than in any other adjacent part. To this he adds the further excellent commentary that for the same reason aneurisms are far less frequently met with in the pulmonary artery than in the aorta, though that vessel appears to be no more capable of resisting the pressure of the right ventricle than the aorta is of resisting the left. The comparative infrequency must be due to the position of the artery.

Some other forms of excitement are named by Morgagni as causes of death from sudden rupture of an aneurism. In this respect venereal excitement is noticed as a frequent cause.

ON VARIATIONS OF THE PULSE.

Morgagni was an able observer of the pulse, and many of the notes which he has left on this subject are deserving of particular study. He was conversant of the fact that whilst a strongly acting heart is usually coupled with a strong and vibrating pulse the reverse may obtain, and the heart may acquire a largely increased magnitude, and may yet become so weak as scarcely to be felt.

A section of clinical discourse on intermission of the pulse is full of practical information and wisdom. Morgagni looked on intermission of the circulation, when it is long-continued and severe, as a kind of asphyxia. Some years ago, in a paper on asphyxia commencing in the blood, I put forward the same idea on similar grounds. I did not know of the thoughts of our present master at that time, and, therefore, considered the observation original, as indeed it was, although I now see that another mind had forecast it.

In treating on the cause of intermission of the pulse Morgagni took a view that has been adopted rather largely in our own day, namely, that flatulency and disturbance of the alimentary tract is one of the most common causes; and he clearly understood that marked intermission may be presented in the absence of all organic affection of the heart itself. He was well aware of the nervous origin of intermittency, and of the development of that symptom from severe mental shocks and strains. He teaches that there are two

kinds of intermittency, one short and temporary, the other more prolonged. The illustrious Lancisi was a sufferer from the long intermission for six years, and in him, according to his own testimony, it was *ex hypochondriorum consensu*. The two kinds of intermittency require different treatment. When the irregularity is dependent on the presence of disordered secretions lying in the alimentary canal, purgatives are the remedies, and he, Morgagni, relates an example in which, during fever in a maiden, an attack of intermittency was removed by a brisk purge. In other examples, where the symptom is due to mental oppression, he pursued a course of treatment that was of a soothing nature. A distinguished professor of physic at Bologna happened to discover that his pulse was intermittent, and being extremely anxious about it, was incessantly feeling his pulse, to discover that the evil was daily increasing. Morgagni's advice to this patient was to take his finger off his wrist and not to enquire too anxiously about his condition. The advice was followed, and the result was a complete removal of the disturbance.

It is a very singular truth that in describing the action of the nervous system on the circulation Morgagni shows that he was cognizant of the fact that the circulation may be disturbed by two sets of nervous irritations, one inflicted through the pneumogastrics, the other "through those nerves which are subservient to the arteries." In one patient he observed great perturbations of the pulse in both wrists as the result of mental anxiety. But a day or two later the pulse derangement was confined to the left side altogether. The pulse of the right arm was quite regular, whilst that of the left arm still showed the inequality. When

the mental distress was relieved, this pulse also became equal.

To Valsalva the credit is given by Morgagni of discovering that derangement of the heart and arteries may be mechanically induced by division of the pneumogastric nerve. But much praise is also bestowed on Molinelli, who practised tying the nerves instead of dividing them.

MISCELLANEOUS NOTES.

In the quotations given above, we have seen sufficient to show what a wide range of knowledge in the field of pathological anatomy and practice Morgagni possessed, and the points adduced very meagrely represent the fulness and richness of his knowledge. He was conversant with the fact that some forms of chronic bronchitis may be mistaken for phthisis pulmonalis, and are only correctly diagnosed by the effects of treatment, the bronchial cases being made clear by the fact of the recovery. He was quite aware that the obstructions sometimes met with in the heart, and called by the ancient medical writers *polypi*, are derived from the blood, and are in truth composed of the same substance as the buffy coat, the fibrine, of the blood. He observed, in some cases in which he had occasion to draw blood, that the odour of the blood was of a nauseous acid character. He recorded as a circumstance of special importance that quartan fever was occasionally ushered in with symptoms of an alarming apoplectic kind. He supported the practice of operating for the removal of cancer, whenever that can be done, not under the idea that the disease can thereby be cured, but because by early operation the speediest relief can be secured with the longest pro-

longation of life, under the condition of general disease incident to the constitutional taint. Many other methods had in his time, as in ours, been adopted for the removal of cancerous growths, and much false hope was often raised by such devices; but if removal of cancer were really necessary, then he seems to be certain that the quickest, the safest, and the surest mode of removal is by the knife, wielded by the hand of the skilful surgeon. A century and a half has passed away since these reflections were penned, and still they remain as true and as practical as ever.

Unwilling to leave the great book on the "Seats and Causes of Disease," I linger a moment more to peruse the chapters in it on diseases induced by poisons. Some of the poisons named are now out of date, and almost of remembrance. Rhododaphne is one of these, the juice of which appears to have had a powerful effect, and which had also about it this effect deserving of note, that it caused a fall in the temperature of the body. Another of the substances commonly in use in medicine in his day in the treatment of melancholia was hellebore. Hellebore must have been a very active drug, for in a dose of about half a drachm of the extract it proved fatal to a melancholic man who had taken it as a remedy. The hellebore caused death by vomiting, pain, and purging, so that probably its medicinal value, whatever that might be, was due to its action on the liver and on the alimentary system.

OPERA OMNIA.

The complete works published by Morgagni were:—
Adversaria Anatomica. Six parts: I. Bologna, 1706; II. and III. Padua, 1717; IV., V., and VI. Padua, 1719; and complete in five volumes, Leyden, 1741,

and Bassano, 1765. This work includes many important researches and discoveries in anatomy by Morgagni, and was the foundation of his early fame.

In Aurelium Celsum et Quintum Serenum Samonicum. Epistolæ quatuor. Padua, 1704 and 1721.

Nova Institutionum Medicarum Idea. Padua, 1712.

A treatise written on his appointment to the chair of theoretical medicine, and indicating the proper methods of study in the higher branches of medicine.

De Vitâ Guglielmini. Geneva, 1719.

A life of Guglielmini, written to accompany the completed works of that physician.

Epistolæ Anatomicæ duæ novas Observationes et Animadversiones Complectentes quibus Anatome Augeter. Leyden, 1728.

A small book written in reference to a disputation with Bianchi on the subject of the structure of the liver. The work was edited by Boerhaave.

Epistolæ Anatomicæ Viri quæ ad Scripta Pertinent Vienti Celeb Ant. Mar. Valsalvæ. 2 vols.; Venice, 1740.

Opuscula Miscellanea. Leyden, 1763.

In this work is included an essay on the lachrymal ducts, with others on glands and on urinary calculi.

De Sedibus et Causis Morborum per Anatomen Indagatis. 5 vols.; Bassano, 1761.

Opera Omnia: Bassano, 1765.

The work to which I have paid most attention, the famous *De Sedibus et Causis Morborum per Anatomen Indagatis*, has passed through ten editions, and in the year 1820 was re-edited in Paris by Chaussier and Adelon, in 8 vols. 8vo. It was translated into English by Dr. Benjamin Alexander, and was published in London in 3 vols. 4to, in the year 1769. In an abridged

form it was re-published in London in 2 vols., by Mr. (afterwards Dr.) William Cooke, an old and much valued friend of my own, who lived almost to the same age as the master he so much revered, and who retained his activity of mind until nearly the end of his long and useful career. To Cooke's edition of Morgagni I am greatly indebted for much useful information and assistance.

THE LAST WORD.

The portrait of Morgagni attached to this life of him testifies that he was a man of fine and noble countenance and of gentle expression ; and everything that is said of him testifies also that he was precisely what he looked to be. He was essentially a fortunate man and a happy man. In comparatively early life he married a noble lady of Forli, one Paoli Vergieri, a companion for him who could not have been surpassed in judgment or in affection. They had a very large family, fifteen children, of whom eight were living at the time of his decease.

To a knowledge of the science and art of medicine Morgagni added the accomplishments of a man endowed with talent for all the refinements of art and polite literature. He gathered around him, as our own Mead did, the best scholars of his day. He so impressed the rulers of his time that he gained their universal friendship and support. The Senate of Venice elected him to his chair of anatomy at Padua ; the King of Sardinia, Emanuel III., esteemed him as his friend ; four Popes, Clements XI., XII., XIII., and Benedict XIV., paid him the same distinction, and Pope Benedict made reference to him in his *De Beatificatione Servorum Dei*.

To these honours, and to those which, as we have already seen, the great societies of learning in Europe gave to him, one other, perhaps the dearest of the dearest to him, was from the place of his nativity. The people of Forli, eight years before his demise, placed to his memory a bust of him in their public hall. The memorial bore beneath it the subjoined testimony to his worth :—

JO. BAPT. MORGAGNO, NOB. FOROL.
PATRIA.

INVENTIS, LIBRISQUE EJUS PROBATISSIMIS
UBIQUE GENTIUM ILLUSTRATA,
DECREVIT A.D. MDCCLXIII.
PONENDUM IN CELEBERRIMO HOC LOCO
MARMOREAM EFFIGIEM
AD HUC VIVENTIS.

And to this was added, around the pedestal, the further testimony :—

HIC EST, UT PERHIBENT DOCTORUM CORDA VIROBUM,
PRIMUS IN HUMANI CORPORIS HISTORIÂ.

To the last Morgagni retained his happy fate. His strong and robust constitution, his quiet and retiring habits, his abstemious mode of life, his persistent activity, tended, one and all, to bring to him the completed existence and the peaceful euthanasia.

In these specialistic days of learning a Morgagni could not be. His industry would win for him no respect, his philosophy no regard. Still, we may bear him in our minds, hoping that, when the husks of modern medical thought are winnowed into space, the opportunity may recur for such true grain of thought, as he possessed and sowed, to rise again.

A HISTORY OF SOME ORIGINAL RE- SEARCHES IN THERAPEUTICS.

ATROPA MANDRAGORA.

IN the course of therapeutical research, I have sometimes been led away from the methodical plan described in the last number of the ASCLEPIAD in order to study the action of some particular medicinal substance which has become known on empirical grounds alone, and by long use has been accepted, for good or for evil, as a real or assumed remedy for disease.

In these side excursions, if I may so designate them, one has interested me very much because of the curiosity of it, as a piece of antiquarian as well as of medical research. I refer to certain inquiries which I instituted in the years 1869-72 into the action of the ancient medicinal substance called mandragora, or commonly, mandrake.

At the meeting of the British Association held at Exeter in the year 1869, my friend the late Mr. Daniel Hanbury, F.R.S., had in his possession a specimen of the substance so well known since that time as chloral hydrate. Mr. Hanbury had just returned from Germany, where he had seen the then new experiments

of Liebrich on the chloral salt; intensely interested in them, he was proud of the opportunity of bringing the first specimen of the drug to England, and was exceedingly pleased to place the same in my hands for experiment.

The result was the special report on chloral hydrate which, at the request of the Physiological Committee, I read to the Association, from experiments conducted in a room lent to me at the hospital at Exeter during the sittings of the Association. The report on chloral hydrate here named introduced the medicine into England soon after Liebrich's discovery of its properties and therapeutical values.

This little narrative would not be mentioned here but that it is immediately connected with the subject now on hand.

In observing the action of chloral hydrate, and the mode in which it made living animals sleep for many hours as if they were really dead, and yet without destroying life, my mind reverted to the traditions that were told in olden times in regard to the action of atropa mandragora. I spoke to Mr. Hanbury on this subject, pointing out to him that the symptoms caused by chloral tallied, in a remarkable manner, with those said to have been caused by mandragora; and I asked him whether his well-known chemical firm had any true root of mandragora with which I could make an experimental inquiry. He promised me that he would inquire, and that if he could not find some at once he would be sure to obtain some for me. In a few months, true to his promise, he sent me a splendid specimen of "mandragora root," gathered in the isles of Greece, from which root I made, perhaps for the first time since the thirteenth century, the "Wine of Mandragora."

THE ANCIENT USE OF THIS WINE.

The wine of the solanaceous plant which goes under the above name is one of the most curious medicinal substances in the whole history of curative art. The word mandrake has become familiar to all ears from the readings about it, first in the Bible narrative, and secondly in the plays of Shakespeare where it is more than once named. The medical narrative respecting it renders it even more remarkable still, for it was, in point of fact, the anæsthetic of antiquity, and played its part uncommonly well, even when divested of all the charms and enchantments with which the vivid imaginations of the poets and other bewitching writers were pleased in their rich fancy to invest it, and when the sketches of it by the artists, equally fanciful and poetic, are put out of sight.

That the old Greek and afterwards the Roman physicians were conversant with mandragora is perfectly certain.

Dioscorides tells us of a draught that may be given to human beings before they have to undergo the pain of the surgeon's knife or the cautery ; and, later, Pliny gives us the formula for such a draught, which not only had the repute of a power to annul pain, but was believed to possess the property of causing a sleep so long and deep that in the borrowed likeness of death life might yet be existing. The physician, the poet, and the historian alike dwell on this potion. Juliet drinks it.

Dioscorides, in his description of this plant, says :—

“ Some persons boil the root in wine down to a third part, and preserve the decoction, of which they administer a cyathus (rather more than an ounce and a half) in want of sleep, or severe pains of any part,

and also before operations with the knife, or the actual cautery, that they may not be felt." Further on he says: "A wine is prepared from the bark of the root without boiling, and three pounds of it are put into a cadus (about eighteen gallons) of sweet wine, and three cyathi of this are given to those who require to be cut or cauterised, when, being thrown into a deep sleep, they do not feel any pain." Dioscorides adds, referring to a kind of mandragora called Morion, that a drachm of it, being taken as a draught, or eaten in a cake or other food, causes infatuation and takes away the use of reason. The person sleeps without sense, in the attitude in which he ate it, for three or four hours afterwards. Medical men also use it when they have to resort to cutting or burning.

"Pliny remarks that the juice of the leaves of the mandragora is more powerful than the preparations made from the root, and that some persons even die from a considerable draught, and that it has the power of causing sleep in those who take it. The dose is, he says, half a cyathus (six drachms). It is taken against serpents, and before cuttings and puncturings, lest they be felt. For these purposes it is sufficient for some persons to have sought sleep from the smell of the medicine. Speaking on the same subject, Apuleius says, that if any one is to have a limb mutilated, burnt, or sawn, he may drink half an ounce with wine, and whilst he sleeps the member may be cut off without pain or sense."

Beyond its use in medicine, the wine of mandragora served many other uses. Under the name of "*morion*," "*death wine*," it is said to have been administered to persons who were being subjected to torture or to prolonged and painful death. There is a Jewish

tradition that at the time when death by crucifixion was one of the Roman punishments, the women of the Grand Sanhedrin were accustomed to visit the prisoners on the cross, and to administer to them, on a sponge charged with morion, this narcotic, by which the sufferings were allayed, under which the sufferers passed into deep sleep, and from which, after removal from the cross, recovery so often took place that the Roman soldiers were instructed to mutilate the bodies of the crucified before allowing them to be removed by their friends for burial. The wine was also used for the purposes of enchantment, so called, and in one of the volumes of the famous "*Superstitions de Tous les Peuples du Monde*," a copy of which I have in my library, there are many drawings of "mandragores," some natural, some artificial. In some of these drawings the natural plant is shown with its flowers and fruit; in others the artificial plant is shown transformed into the semblance of man, the cleft of the root of the plant representing the legs of the man, the upper part of it the body, arms, and head. The authors of this learned work assume from the traditional records that there are two kinds of mandrakes, one male, the other female. They give the root the credit of being emollient, narcotic, and sleep-producing. They also assign to it that it was believed to possess the power of enchantment. It has been supposed by some other scholars that the mysterious drug employed by the "Old Man of the Mountain" was mandragora; but the most common belief is that in this regard mandragora takes the credit that should, historically, go to "haschisch," the extract of Indian hemp, the *cannabis indica*.

How cleverly our national poet used the knowledge

he possessed of mandragora we all know. The skilful Friar Laurence, in giving the draught to Juliet, is all pat with the fullest physiological description of the action of atropa mandragora, until he comes to the last part, in which, for the sake of an inducement to Juliet, he makes the awakening much more pleasant than it is according to nature. When Juliet speaks her terrors of the grave, and when Macbeth tells of the "insane root which takes the reason prisoner," the poet is nearer the mark. Directly or indirectly, Shakespeare would probably get his knowledge of mandragora from the "*De Viribus Herbarum*," attributed to Lucius Apuleius Platonicus, and republished, with a chapter on mandragora, at Paris in 1528. Or he might have got it from one of the many re-editions of the work, "*De Virtutibus Herbarum*," attributed by some scholars to Apuleius Lucius, by others to Apuleius Celsus. Or again, it is just possible that mandragora was occasionally employed in the historical period within the range of tradition of Shakespeare's time, for down to the thirteenth century the wine of mandrake continued in use. It was called mandragorites, and was made by putting half a pound of the bark in nine gallons of wine and allowing it to stand for three months. Persons who partook of it were called mandrakes or mandragorites; and as on recovery from its effects there was wildness of the senses and fear, the saying of shrieking like mandrakes became applied, by a strange perversion, to the plant instead of the person :—

"And shrieks like mandrakes torn out of the earth,
That living mortals, hearing them, run mad."

With the revival of letters this use and application of

mandragora passed away. The substance enters into none of our Pharmacopœias ; even the Persian medicine books do not retain it. Its ally, belladonna, gained and retained its place ; mandragora was lost.

THE NEW RESEARCH.

On obtaining the mandragora root from Mr. Hanbury, I cut it up into very small parts, and essayed to make a tincture from it, with strong alcohol. The product was so negative in its action, I was inclined at first to believe either that the root I had obtained was not true mandrake, or that all the old stories were fables. In this belief I was wrong ; the error lay in my own preparation. The active principle of mandragora is most soluble in water, as is also the active principle of atropa belladonna. The ancients seem to have known this fact, for they either made an infusion or decoction of mandrake, and afterwards added wine, by which the decoction was preserved, or they digested at once and for a long time in a weak wine. Recognising a possible source of error, I next made a weak tincture, using only one-sixth of alcohol, and letting the root, in fine powder, macerate for four weeks. The product in this case was found to possess the most active properties, properties faithfully represented by the ancients in their observations.

The tincture of mandragora was administered either by the mouth or by subcutaneous injection, and the active principle was absorbed with great rapidity. The effects produced were those of narcotism, dilatation of the pupil, paralysis of motion and sensation, excitement during the stage of recovery, if the dose were not fatal, and sleep and paralysis if the dose were too potent. The action was found to extend to all classes of animals,

but the dose required to induce the same effects in different classes of animals varied.

In full-grown pigeons so small a quantity as five minims of a good tincture was sufficient to produce effects if the fluid were administered hypodermically. The first symptom was that of drowsiness, which soon passed into deep sleep. The sleep might last from half an hour to an hour, broken by short and peculiar paroxysms, not of waking, but of excitement, as if from a disturbed dream. The excitement continued for several seconds, when the animal fell back again into sleep. Recovery took place with a successive series of these sleepings and excited awakenings, and, finally, there was always some wakeful excitement, lasting for so long as an hour, with flapping of the wings and imperfect efforts to fly.

In rabbits the dose required to produce an effect had to be very large, by comparison; three fluid drachms, for instance, was taken by a full-grown rabbit without danger. In these animals mandrake induced very gentle sleep, which often extended over an hour, the awakening being attended by some degree of excitement and wandering of movement.

When in the two classes of animals named above the dose of mandragora was carried to the extent of producing fatal effects, the mode of death was by continued narcotism and by failure of respiratory power. The paralysis of all the voluntary muscles was complete, and the pupils were widely dilated, showing that the paralysis had also extended to the involuntary muscular fibre. The heart, nevertheless, continued in action longer than any other part, and, indeed, was found to be pulsating after the respiration had for many minutes ceased. In one instance, in the rabbit, the heart remained seven

minutes in action after the perfect failure of respiration. The cause of the ultimate cessation of the breathing was peculiar. The failure was not primarily due to failure of the nervous power, but to obstruction from excessive accumulation of secretion in the bronchial passages, *hydrops bronchialis*. Under the resistance thus induced the respiratory muscles flagged and finally ceased action. The muscular irritability of the voluntary muscles was little impaired by mandragora. I succeeded in exciting action in the muscles by a gentle electromagnetic current so long as an hour after death. Hence the action of mandragora would appear to be purely upon the nervous centres.

ACTION ON MAN.

The influence of mandragora upon the human subject was well marked. When the tincture was applied to the tongue it produced a sensation of numbness, which lasted for several minutes. It communicated also a singular taste and sensation of acidity and dryness, which lasted for several days. In doses not sufficient to produce actual narcotism the symptoms induced were, desire for sleep, a sense of fulness in the vessels of the head, a peculiarly enlarged and confused vision, an exaggeration of sounds and noises, an inaction of the bowels, with white, hard fæces when the bowels were made to act, and a singular restless and nervous excitability, closely akin to hysteria. These symptoms were not actually removed for two days, and they left a lingering uneasiness and coldness for a much longer period. The whole of the facts indeed lead clearly to the acceptance of the belief that the medicinal use of mandragora in ancient times has been correctly recorded.

The wine of mandragora is a general anæsthetic of the most potent quality. The action no doubt depends on the presence of an alkaloid which is like, if not identical with, atropine, and from it an alkaloid could be extracted which might be used medicinally, and which would, I have no doubt, be one of the most active anæsthetics we have yet discovered. From the circumstance that the heart continues to beat after the respiration has ceased, we may infer that as a general anæsthetic the alkaloid might, under necessity, be once more employed, as in the olden time, to deaden the pain of a surgical operation, and that too with comparatively little risk to life. Perhaps, also, the alkaloid might be used for dilating the pupil as atropine is now used. Perhaps, again, it might prove to be antagonistic to strychnia, and to the poison of tetanus.

One further fact struck me particularly in respect to the action of mandragora, namely, its powerful benumbing local action. On applying the tincture to my lips there was produced an insensibility which lasted for more than an hour, and was very decided. It is probable, therefore, that we have in mandragora a good local anæsthetic, which, with all our advances, is still a desideratum.

I shall return to the subject.

COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FRIEND.

CONSTRUCTION OF HOSPITALS FOR THE INFECTIOUS SICK.

DURING the past quarter a rather brisk discussion has been in progress on the subject of the construction of hospitals for the infectious sick. The question came to the front, this time, on the proposition to erect a hospital of the kind at Nottingham. In regard to the construction of this proposed institution, Dr. Bell Taylor suggested that the plan recommended in these pages, Vol. IV., pages 352-4, should be followed, and that Nottingham should set the example of erecting, at a very moderate cost, a handsome temporary hospital, that could be removable at pleasure, and that would admit of being cleansed at all times while it was in use, by the one and only true purifier, *fire*. At first it seemed as if Dr. Taylor's suggestion would be listened to, but on the subject being referred to the local medical society, by the authorities, the idea was voted down, and a recommendation was returned which has, I believe, resulted in the resolution to build an infectious hospital in Nottingham, on the old and permanent style, at a cost of the tremendous sum of £23,000.

One of the advocates of this expenditure is reported to have based his support of the design for a permanent institution on the argument that if it were carried out a hospital would be founded for the infected sick that would last a hundred years. If this were not a grim joke it was one of the severest cuts at medical science that could have been inflicted on our unfortunate body by the worst enemy it ever had in all its history. The idea that a world of medicine, numbering in a century over a million of intelligences, spread all over the earth, with increasing knowledge pouring in on them from every side, and with the strongest ambition and inducement before them to discover and remove the infectious diseases altogether,—the idea that such a body of seekers after truth should go on groping and fooling for a century, instead of sweeping the infectious maladies clean off the planet, is really too monstrous. An outsider from the profession of medicine could hardly have been expected to have taken so poor a view of the progress of medical science and art; but, for a medical society to have tacitly endorsed and indirectly encouraged so sad a prospect is past all comprehension. I give it up, yet not without a deep feeling of sorrow that it should be possible to place the fact on record. How will the people of Nottingham of a hundred years hence feel about the matter? Those who have now endeavoured to advance the views which long before then must be dominant will have no occasion to be ashamed.

In the course of the debate, outside the direct field of contest, some very curious notions were put forward, which time also will dispel. It was assumed that because a few thoughtless attempts to warm by open fires certain ill-conceived temporary hospitals failed in their object, as any one with the most ordinary

common sense could have foreseen, therefore the construction of light, handsome, cheap, easily removable, and easily purified hospitals must needs be a failure. But who would think of proposing to warm a hospital of this kind, or, indeed, in this day, of any kind, from an open fire? The idea is out of the question. With the present facility for warming a room to any temperature by the introduction into it of pure warm air in current, and in such manner as to ventilate as well as warm, no such thing as an open fire need for a moment be thought of.

In a communication to the *Lancet* I have ventured to enter so fully into the practical part of this subject that it is quite unnecessary to renew the discussion here. It is sufficient to say that in the parish in which I reside we found two temporary hospitals, erected some years ago during an epidemic of small-pox, so effective that the complete removal and disposal of them was a mistake which the parish may one day have occasion to regret. These hospitals cost the parish less than one-twentieth part of that which the people of Nottingham are about to spend, and they might have been standing now in as good a condition as ever.

The thing that requires to be done is for some one to build, either in iron and wood or in glass and iron, a model hospital on the best principles, so as to prove to even the dullest intellect that an institution perfectly adapted for the infected sick can be erected at a comparatively small cost, and, whilst easily removable, be sufficiently permanent to keep abreast of all requirements. One such institution constructed, say, by so competent an authority as Dr. Collie, would set the whole question at rest for good. If I had the means I would do it myself, and be proud of the opportunity of

discrediting a system which depends alone for its support on two arguments. (a) That because it has been, therefore it ought to be. (b) That because a number of clumsy and inadequate attempts to supersede it have failed, therefore it cannot be superseded.

DEATH BY ELECTRICITY.

THE State of New York has, it is said, resolved to put all prisoners, sentenced to death, through the last penalty by means of the electric shock. The idea, humanitarian in its character, is founded on a misconception. In disgust at the foolish barbarism of the time, which keeps up the crime of capital murder, the humanitarian fraternity, afraid to support the sound and logical policy of abolition of the extreme offence, tries to dally with reason and conscience by the attempt to divest executions of all pain and all terrors. Euthanasia for the worst of criminals, by the side of so-called natural, but often most cruel, death for the rest of mankind, is practically the proposition ; a proposition which carries with it its own condemnation.

Whilst executions still continue, there is nothing in the present and long-established plan of carrying them out which needs to be changed. If the process be considered brutal, it is not more brutal than the spirit of the act itself, all attempts to refine which cannot add to its efficacy as a deterrent of crime. The process of hanging looks brutal without actually being so. Since the age of Morgagni, whose life is published in this *ASCLEPIAD*, the question now under discussion has been considered, and the opinion of the best-informed physiologists, then and since then, has always been that

death by strangulation, or by suspension, is practically a painless mode of death. Persons who have recovered from the unconsciousness produced by strangulation have testified completely on this point; and that the old and legal method of death by suspension, according to the terms of the judicial sentence, should, at the instance of any ignorant and common officer who may carry out the sentence, have ever been changed for the sudden long drop, or death by an excruciating and cruel blow, is incredible. Some member of the House of Commons ought to put to the Secretary of State for the Home Department, who is charged with the duty of directing that the law, be it good or bad, shall be carried out, the question why the gentle, though it may seem prolonged, extinction of life by hanging should not be restored.

While death is the national punishment for murder, this national mode of vindicating the law is also the most rational. Making the method of execution more scientific, if it be right to degrade science by so connecting her civilizing powers with such degrading and ignorant work, is simply to put a premium on crime itself. Since I set up a lethal chamber for the painless extinction of the lives of the lower animals, I have more than once met persons, not strictly insane, but in morbid states of mind, who have looked on the lethal easy death as a prospect of release from life so invitingly pleasant, that if such mode of death were to be adopted as the national plan of capital murder, they would not hesitate in some of their worst moods to kill that they might be killed, since the severest fate that could happen would be a death brought to the painlessness of pleasure.

Death by the electric shock would convey to minds

of this stamp the same anticipation, but would not necessarily produce the same certain result. In some researches on the application of the electric discharge for the painless extinction of the lives of animals to be used as food, the details of which I recorded in the *Medical Times and Gazette* for the year 1869, this mode of death was anything but certain in its effects. Sheep stricken apparently into instant and irrevocable death by electricity, after a few minutes, showed signs of life, and if they had not been despatched in the ordinary way by the knife would have been restored to consciousness. The same fact has been observed in attempts to kill dogs by the electric shock, and I once published an instance in which a large dog, struck into perfect unconsciousness by the stroke from a powerful battery, was submitted to a surgical operation whilst lying, to all appearances, dead, and was yet so little affected as to make an easy and sound recovery. It need not be inferred from such facts as these that the electric shock will not kill at one discharge; in most cases it will; but, exceptionally, instead of killing outright it will simply stun, and may induce the semblance of death instead of the real event. It will be only common humanity, therefore, for the authorities of New York, when they begin to give the *coup de grace* by the electric shock, to supplement the process by a post-mortem examination of the victims, so that the act may not be crowned by burying the victims alive.

Let us hope, after all, that these new experimental trials for the extinction of life by the sane part of the community, as example to the insane of the sanctity of life, will be the beginning of the end towards the abolition of the capital penalty.

WATTS'S "DICTIONARY OF CHEMISTRY."



QUARTER of a century has passed away since the first appearance of Watts's famous "Dictionary of Chemistry," a work as distinctive in our day as Fourcroy's was in the early part of the century. At his death—an event we all so much deplored—Watts left behind him a plan for a new edition of his work, for which he had prepared instructions for contributors, and had written sixty-three pages for the revised work, to appear in four volumes of about seven hundred and fifty pages each. The labour has since been completed by other hands.

The first volume, extending from A to CH, has now been issued by Messrs. Longmans, under the very able editorship of H. Foster Morley, M.A., D.Sc., and M. M. Pattison Muir, M.A., assisted by many eminent contributors. In this effort chemistry has alone been treated on, the allied branches of other sciences being omitted. Methods of analysis are, with a few exceptions, also omitted, the new edition not being intended for the use of analysts in the laboratory. Amongst special editorial aid, the editors naturally refer with great satisfaction to the distinguished names of Dr. W. J. Russell and of Professor J. Carey Foster. Each editor contributes an introduction to his special part.

In commencing the study of this new and important treatise, the student must begin diligently with the introduction to the article relating to organic chemistry. Here, unless he has kept up very closely with the progress of chemical science, he will find an immense deal to learn. He is in contact with young and active minds, well stored with everything to the latest date. I confess, for my own part, that the study of this intro-

duction gave me more than one sleepless night. To learn it is like going to school again, and I could not restrain the wonder of what my old and revered masters, Professors Graham, so philosophical, and Professor Penny, so practical, would make out of it all if they could re-visit their old haunts, and pick up this new volume as their first re-introduction to their favourite science.

Although the "Dictionary of Chemistry" is particularly addressed to students of chemistry, there is much in it that is of remarkable importance to members of the profession of medicine, and indeed no medical library can be considered complete that has not got it on its shelves. In addition to the descriptions of the different chemical bodies, there are many chapters on various branches of chemical philosophy which call for careful reading, and which will be read with certain benefit. I notice amongst these the admirable article of Professor Ostwald on "Affinity;" the essay on the "Atmosphere," by Professor Thorpe; on "Bacteria," by Professor Ray Lankester; and on "Detection and Estimation of Poisonous Alkaloids," by Dr. Thomas Stevenson. The article on "The Blood," although containing some good points, is not so comprehensive as it might have been. Its author, Dr. Halliburton, has followed too closely the ordinary text-books, repeating what they say pretty well off hand, instead of tracing the course of progress on the subjects to which he directs attention. Thus, in respect to the hypothesis of the cause of the coagulation of the blood, he treats, in the briefest manner, the various and varying conditions which modify the phenomenon, and accepts, without a word of reserve, the lamest of all the hypotheses—the ferment hypothesis—that has ever been broached on the

matter; an hypothesis which invents one speculation in order to support another. The essay on "Chemical Change," by Dr. J. J. Hood, brings the first volume to a close in a most efficient tone and method. It is the work of a new pen, but leads along easily and soundly.



TABES MESENTERICA AND PHTHISIS PULMONALIS.

(BY W. T. GAIRDNER, M.D., LL.D., AND JOSEPH COATS, M.D.)

IT is not often that two authors appear under one pair of covers, each contributing essays on different subjects. In the present volume this is the fact,—an excellent proof of the saying how good a thing it is for brethren to dwell together in unity.

In this work (published by Messrs. Longmans), Dr. Gairdner opens the ball with the course of lectures on *tabes mesenterica*. He is speaking to students, and he is at the same time speaking as a student, so that from the beginning to the end the interest is sustained. The first lecture deals with the history of the disease; the second is nosological and clinical; the third treats on diagnosis and prognosis; the fourth is on practical points relating to prevention and cure. To the whole there is an appendix, consisting of cases in illustration, with remarks; and so the Gairdner portion of the volume is brought to a conclusion.

Dr. Coats supplies five lectures on his subject. In the first he describes the two typical forms of phthisis; in the second, the conditions allied or analogous to phthisis, and the causation of the disease; in the third, the tubercular bacillus and the extension of tuberculosis

from its original seat; in the fourth, the predisposing causes of phthisis, the process of healing, and the secondary phenomena in the lungs; and, in the fifth, the secondary phenomena outside the lungs, including manifestations of the true tuberculosis in other organs, together with the diseased states which are secondarily induced by the perversions of function incident to the tuberculous condition of the body.

There is an immense deal in the titles given by authors to their essays and volumes. A man who cannot find a good descriptive title to his work can rarely, if ever, write anything worth reading. An author who finds a good title always promises well from the first, and, if he sticks to his text, almost always does well to the end. It will be seen by the above brief description that the authors of this new volume have been extremely happy in their titles, and it is due to them to say that they have been equally happy in their mode of treating and of illustrating the subjects which they have brought under observation. No practitioner, young or old, can rise from the study of the volume without feeling that, on the points brought under his review, he has renewed his past learning, added to his present, and gained an immense deal of useful, vigorous, and original suggestion for the service of the future.

INEBRIETY.

(BY NORMAN KERR, M.D., F.L.S.)



THE handsome volume of four hundred and fifteen pages, which Dr. Norman Kerr has published during the quarter (through Messrs. H. K. Lewis), dwells fully and very ably on all points relating to that unfortunate state or condition

of body called, generally, inebriety. The four leading parts of the subject studied by the author are: (a) The etiology, (b) The pathology, (c) The treatment, (d) The jurisprudence of inebriety. But these major parts are subdivided into a large number of minor parts, which, as presented to the reader, are each of peculiar interest and of practical value. It does great credit to the cause of temperance that such a book should issue from its ranks, and it is a striking piece of evidence of the enormous strides that the temperance cause is making amongst all classes that such a work should have come from the pen of a practitioner of medicine. Twenty years ago the event would have been quite impossible. There was at that time no one who could have written the book, and no one who would have attempted to have placed it before the world. The book is, *par excellence*, a product of the present day. The author opens with the statement of the opinion, now gaining common acceptance, that inebriety is a disease. In this he is right, and when to the statement is added the fact that the disease through all its stages is one the cause of which is known from the bottom to the top of the scale, a new chapter in pathology is unveiled which throws a strong light on the whole field of disease, and indirectly on all causes of disease. In speaking of the treatment of inebriety the author says that the disease may be diagnosed long before any act of drunkenness has taken place. Shiftiness, untruthfulness, ill-grounded suspicions, exalted ideas, are all symptoms to be met with in the latent stage of the disease, before the patient has drunk a glass of intoxicating liquor.

How true this teaching is they whose experience, in their professional labours, brings them into contact

with the inebriate community can alone appreciate. It is a daily lesson, and it marks a period during which the attempt to arrest the progress of the inebriate disease is most anxious and most disheartening. Patients in this early stage are obstinate, self-willed, and domineering to the last degree ; they refuse to be guided ; they tell their guides that they know their own constitutions best ; they tell their friends that their doctor may be a very clever man, but that he rides his favourite hobby to death ; they run from one doctor to another, and try to twist the stray morsels of advice which they collect into some kind of admission that they may take a little stimulant with advantage ; they deceive the practitioner with their stories about the superhuman amount of work and responsibility which they are bound to undertake ; and, worse than all, they deceive themselves on points upon which their own dearest interests are hourly at stake. In this way, as Dr. Kerr most truthfully shows, the period for reformation, that is of all others precious, is allowed to pass away, leaving a third, and all but, incurable stage of alcoholic disease as the inevitable future.

In the Appendix of the work Mr. R. W. Branthwaite, medical superintendent of the Dalrymple Home, sums up 103 cases of inebriety, with results of treatment.

One or two subjects of the exceedingly interesting book now under notice are here named, in order to indicate to readers who have not yet obtained it for study how excellent it is in parts even when dipped into at hazard. The same excellency is maintained from the first to the last page, and will, it cannot be doubted, be continued in the future editions which are sure to be demanded.

OPERÆ PRETIUM EST.



VARIED list of books of exceeding interest has come to hand from different parts of the world since the last issue of the ASCLEPIAD.

Some it is necessary to reserve for future study ; a few must be noticed here in this brief record as immediately of moment to readers.

(1) A quaintly printed and richly illustrated book on "Engravers and Engraving" is from the pen of Mr. Francis Vacher, of Birkenhead, as an inaugural address to the Birkenhead Literary and Scientific Society. It is a very fine scholarly effort,—a book to be put by in the treasures of the library. (2) Mr. Clarke Bell, President of the Medico-Legal Society of New York, issues an eighth "Inaugural Address," in which he reports the progress of the Society, and adds the excellent suggestion that the time has come for the holding of an International Medico-Legal Congress, in which members of the medical and of the legal professions shall take part. (3) Mr. F. H. Gervis contributes a learned and charmingly written essay on the "Sweating Sickness," read before the select little society or club called the "Sette of Odd Volumes." Two engravings, very rare, are introduced, one a sketch of Petrus de Montagnana, the great mediæval doctor ; the other a picture of a plague-stricken patient, attended by a doctor and a couple of attendants burning incense. A complete copy is also given of the famous "*Non Sudore*" prayer. (4) Dr. Isaiah de Zouche, of Dunedin, writes a paper on "Inebriety, and the Duty of the State with regard to Inebriates," in which he maintains that it is the duty of the State either to establish or to license retreats, or to do both. (5) Dr. Charles Bell Taylor publishes

(through Messrs. Redway) a valuable course of lectures on "Diseases of the Eye." The lectures, six in number, are on the subjects of cataract, squint, glaucoma, optico-ciliary neurotomy, the use and abuse of mydriatics, and eye troubles in general practice. The lectures were delivered to students and practitioners of the Nottingham and Midland Eye Infirmary, and are published by the request of the class, as lessons calling for something more than a passing notice, an opinion which all who read the discourses will heartily endorse. (6) A short memoir, by Dr. Solis-Cohen, of Philadelphia, on "Recent Advances in the Treatment of Pulmonary Consumption," suggests as the best mode of treatment: an abundant and proper diet, the drinking of hot water or hot lemonade, moderate open air exercise, respiratory gymnastics, daily inhalations of compressed air, and the administration of hypophosphites. Iron, the author thinks, is best borne, and is most useful when it is administered in combination with the practice of inhalation of compressed air. (7) "The Pathology and Treatment of Ringworm" forms matter for an admirable practical treatise by Dr. George Thin (Messrs. J. and A. Churchill). Dr. Thin defines the pathology of ringworm as a specific inflammation, its specific characters depending on the effects produced on the blood-vessels of the cutis by the growth of *trichophyton* in the horny layers of the epidermis and root-sheaths of the hairs. The details of treatment are carefully and conscientiously related. (8) Mr. Brudenell Carter re-publishes "The history of a case in which the sheath of the optic nerve was opened behind the eyeball in order to permit the escape of fluid in a case of great swelling of the termination of the nerve within the eye." The result of this operation, performed by Mr.

Carter on a woman twenty-six years of age, shows the important fact that the sheath of the optic nerve can be exposed to view; that any fluid which it contains can be evacuated by incision; and that this can be accomplished without risk to the patient, or without the possibility, assuming the exercise of due care and skill, of any injury to the eye. (9) A volume on "Fevers: Their History, Etiology, Diagnosis, Prognosis, and Treatment," by Alexander Collie, Medical Superintendent of the Eastern Hospitals of London (H. K. Lewis), is a book of reference on fevers from an author whose opportunities for observation have been of the best, and whose powers of observing are equal to his opportunities. The book is a treasury of facts on fevers. (10) The third volume of "Hazell's Annual Cyclopædia," edited by E. D. Price, F.G.S., is a *summum bonum* of facts and figures. Now it is at hand the wonder is how we did without it.

TO CORRESPONDENTS.

Books, Reports, and Pamphlets intended for notice in THE ASCLEPIAD should be addressed to the Author at his residence, 25, Manchester Square, London, W.

Names of Subscribers and other Matters of Business should be forwarded to Messrs. Longmans, Paternoster Row, London, E.C.

Advertisements, and all Communications respecting them, should be forwarded to Mr. A. P. Watt, 2, Paternoster Square, London, E.C.

The Author will be greatly obliged if senders of Newspapers and Magazines would kindly mark the passages to which they wish to direct attention.

May
15th,



1888.



METHYLENE AS AN ANÆSTHETIC.

THE anæsthetic fluid which I introduced into practice in 1867 as Methylene Bichloride, and which has acquired the shorter name of Methylene, is at present being re-discussed with some considerable warmth.

To a patient under the care of Sir Spencer Wells I first administered Methylene on Oct. 15th, 1867, after I had concluded my original researches upon it and had myself been put under its influence, for a preliminary trial of it, on the human subject; and, Sir Spencer has written recently to the *British Medical Journal* to say that ever since its introduction he has used no other anæsthetic. He adds that he has used this anæsthetic over twelve hundred times; and has never seen any signs of danger that gave him cause for anxiety. Moreover, he maintains that the action of Methylene is special, just as I originally described it to be, and he leaves a description concerning it on the minds of his readers to the effect that, taking it all in all, it is the handiest, readiest, and best of the whole of the anæsthetic series.

To me this testimony is naturally most gratifying, and the opportunity of speaking on the subject being opened, I avail myself of it in order to try and remove some of the many curious errors—and I had almost said ignorances—which have been set on foot in regard to a very plain and simple medical and physical question. In undertaking the task I cannot do better than republish the following report which I made on Methylene to the Section of Physiology of the British Association for the Advancement of Science in the year 1868.

“REPORT ON BICHLORIDE OF METHYLENE IN 1868.”

“In my last report I described that the Bichloride of Methylene ($C H_2 Cl_2$) was an excellent anæsthetic substance, and for many reasons preferable to chloroform. I have since confirmed this view fully by practice. After subjecting myself to the action of the vapour to the production of perfect insensibility, I ventured to administer it for surgical purposes on the 15th of October last, 1867. The sleep produced was of the deepest and gentlest character, and the operation, performed by Mr. Spencer Wells, and which lasted thirty-five minutes, was quite painless. One trifling difficulty only stood in the way: the air of the room being warm, and the fluid having a low boiling-point, the water from the breath of the patient, with which the inhaler was saturated, became frozen, and was somewhat troublesome. The difficulty was very soon met by the invention of a new form of inhaler, now exhibited to the Section. This inhaler answers, not only for the administration of bichloride of Methylene, but for all fluids which boil at a low temperature and are useful for inhalation.

“The instrument is constructed in such manner that the fluid can be conveyed, grain by grain, and distributed in the form of spray on a surface of thin flannel, spread over a mouthpiece made of vulcanite.

“Bichloride of Methylene differs from chloroform in action in several particulars. The anæsthetic sleep is produced more quickly, and when produced is more prolonged. On the other hand, recovery, when it commences, is far more rapid; indeed, the period of recovery, according to my experience, is never extended over four minutes, and there are no tedious or painful after-effects.

“When animals are allowed to sleep to death in vapour of bichloride of Methylene, the lungs are found containing blood, but not congested, while the heart contains blood on both sides. In this respect the vapour acts differently from both chloroform and ether. After death in chloroform-vapour the lungs are left bloodless, and the right side of the heart gorged with blood. After death from vapour of ether the lungs are left intensely congested, with the heart containing blood on both sides.

“Bichloride of Methylene holds a place between ether and chloroform. It is safer than chloroform, but not so safe as ether. In matter of efficiency of action it is equal to chloroform, while it is quicker in action, and more persistent, and far more manageable than ether.

“Bichloride of Methylene has been largely used by other observers during the past year. Reports of its employment have reached me from New York, Paris, Hanover, and other parts of Germany, from Australia, and from different towns in England. These reports are unexceptionably good, and no fatal accident has as yet befallen the administration.

“There is, however, as yet one drawback to its general introduction: I mean the difficulty of manufacturing it on a large scale at a reasonable cost. It is also when pure more difficult to retain than chloroform, its boiling-point being at least thirty-three degrees lower on Fahrenheit's scale.

“The question of the exact composition of the bichloride of Methylene has been recently determined from analysis by one of our best organic chemists, Mr. Perkins, who has confirmed the composition as CH_2Cl_2 . He has, however, made a correction of the boiling-point, which he places at 104°F . (40°C). This is 16°F . (8.8°C .) higher than has been given to it by other observers, as well as by myself. Quite independently I had also detected this error, which has arisen, I doubt not, from the presence, in the earlier specimens of the fluid, of a little chloride of methyl. I think that even yet there is some slight cause of error, and that the boiling-point is actually 111°F . (43.8°C).

“The difficulty of manufacturing bichloride of Methylene in sufficient quantities at a reasonable cost is, I repeat, the only objection to its more general employment. In quantities of two or three ounces the manufacture is easy; but the distillation at a low temperature, which is required, renders the process tedious on a large scale, and therefore expensive. The difficulties, I trust, will, in time, be overcome.”

The above report, published in 1868, conveys as clearly as anything which I could write now the position of Methylene as an anæsthetic. It disproves at once an incorrect statement made by two French experimentalists that they, in some recent researches, were the

first to study the action of the pure bichloride, and it accounts for the difficulties that have been met with in obtaining the substance in the absolutely pure form in which I first recommended it and first employed it.

THE PREPARATION OF METHYLENE.

Speaking on this point of manufacture, I think it is possible that some specimens of an unsatisfactory character have now and then found their way into the market. In two instances, where death took place after the inhalation of a preparation believed to be Methylene, a portion of the fluid, removed from the same specimen, was sent to me, and proved to be chloroform pure and simple. From what afterwards transpired, the mistake turned out, in one of these cases, to have been accidental on the part of the dispenser.

On the whole, a very good practical preparation has been supplied, and I know from frequent personal observation that the principal manufacturers, Messrs. Robbins, have throughout followed in most careful manner the approved method of preparing the article, namely, by the action of chloroform on zinc. In order to start and to facilitate the action a little absolute alcohol is at first added, and it is found during the action that water is formed in small proportion, and that small quantities of alcohol and chloroform are left in the distillate. By repeated distillations these could be removed, but as their removal would make the fluid so expensive that it could not be obtainable, commercially, at a reasonable price, the question comes up whether it is really necessary to submit the fluid to the complete distillations required for absolute quality. This is a question best answered by the test of effect under administration. Theoretically, there is

no objection whatever to the presence of a small proportion of water or of alcohol if they do not interfere with the efficiency of the anæsthetic. I have therefore carefully compared the action, during administration, of the commercial specimen, as it may be called, with that of the absolutely pure specimen with which I first experimented. The result is that the commercial specimen possesses, if anything, some advantages over the pure. It is a little less volatile; it is not quite so pungent; it is rather more equable in its effects; and, above all, it is more stable as a fluid which has to be kept. It was one of the difficulties of the absolute bichloride that under the influence of light, and some other external influences, it was apt to decompose and to give off free chlorine, a change which rendered it dangerous, and which misled one unexperienced experimenter altogether as to its real anæsthetic value. The commercial specimen is free of these defects, and, as Sir Spencer Wells, Dr. Day, and myself, have observed, retains the good qualities that have specialised it. The sole objection to it is the little residue of unreduced chloroform.

ADMINISTRATION.

I have administered Methylene frequently since I introduced it in 1867 (twenty-one years ago), and have never experienced any difficulty or danger. I have administered it to persons of the most varying ages, from an infant a few months old to a man of eighty-six, and always with the same good results. The rapidity of its action is quite extraordinary. Once, when I was visiting a large provincial town, a Surgeon Dentist there who was using Methylene daily sent me

an invitation to come and see his administration. He had collected a large number of patients, and the successful rapidity of his proceeding was beyond my expectation. He used Junker's inhaler, working the bellows with his foot, and throwing as much of the vapour as was possible into the mask the moment it was applied to the face. At the end of nineteen seconds, counted by an assistant, he operated in every case, the mouth being ready opened by the gag, and in every case he extracted without subjecting the patient to the slightest pain. The recovery was as rapid after the operation as the anæsthesia which preceded it, and he told me that he had never had any symptom that gave him alarm or trouble. I witnessed fifteen painless extractions of teeth in different persons in a shorter period than could have been carried out with any other anæsthetic with which I am acquainted. One remark made by my friend the Surgeon Dentist struck me as being particularly shrewd and practical. He said in reference to the rapidity of the administration that it gave no time for the development of fatal symptoms. "There is not enough time to die in nineteen seconds; there is not sufficient time for the inhalation of a poisonous dose," so he reasoned.

Sir Spencer Wells, Dr. Day, Dr. Field, of Bath, and other observers of the action of Methylene, agree with me as to its specific qualities, the rapidity of its action and recovery from it. But the rapidity of its action as an anæsthetic does not, in the least, interfere with the prolongation of its effects when it is necessary that the anæsthesia from it should be prolonged. This is an unmistakable and exceptional advantage. I have seen a complete narcotism, an operation, and a recovery to consciousness, from Methylene, within four minutes ;

and I have seen perfect anæsthesia sustained by Methylene for four hours.

MODE OF ADMINISTRATION.

When I first brought out Methylene, I got Messrs. Weiss to construct for me the spray apparatus named in the report quoted above. It answered well, but was rather troublesome. A little later Dr. Junker invented the inhaler which bears his name, and which I have since then used, as a general rule, in preference to any other inhaler. Exceptionally, however, I have administered from a funnel of leather, holding within it a layer of flannel; from a funnel of paper lined in a similar manner; and once, very effectually, from a funnel improvised out of a starched loose wristband, detached from the wrist in an emergency, and made to hold a piece of soft linen to receive the fluid. The only point to bear in mind, in these rougher modes of administration, is that Methylene, being lighter than chloroform, requires more protection. From the surface of flannel or lint spread over a metal frame (Skinner's inhaler for chloroform) it volatilizes too rapidly. This explanation will, I trust, be a sufficient answer to Dr. A. Ogeir Ward and other professional friends who have written to me for an opinion as to the best mode of administration. In the use of Junker's inhaler I generally produce good narcotism within five minutes, and rarely require more than from two to four fluid drachms of the liquid for deep narcotism.

IS METHYLENE STABLE AS A PREPARATION?

I am often asked the question whether Methylene is a preparation that can be kept without danger of

decomposition. The idea that it cannot, an idea which many entertain, is due to my own early publication that pure Methylene Bichloride is very easily decomposed, giving off, in the decomposition, free chlorine, and so becoming dangerous for inhalation. This was the fact, and this same fact not duly recognized has led some experimenters to declare that the pure agent is not an anæsthetic. The substance commonly sold as Methylene, in which the distillation is stopped before the absolute substance alone comes over, is free from this objection; but as it is more volatile than chloroform, it requires to be kept, with a little more care, and in a cool place shut off from the light. With these simple precautions it can be completely preserved, and is ready for use at any time. In the form commonly sold it is also moderately cheap, although in the pure form it would be very expensive, a fact for which Professor Tyndall is given as the authority, but which came first from myself as a result of the effort to bring the pure substance to something like a reasonable cost of production. Failing in this effort, I thought it honest to explain the fact freely, and I should have given up the use of the bichloride had not the difficulty been overcome by the later knowledge that a less refined product answers even better for anæsthesia than the real $\text{C H}_2 \text{Cl}_2$.

CONDITIONS OF BODY UNFAVOURABLE FOR THE ADMINISTRATION OF METHYLENE.

Dr. Day in his valuable essay on Methylene (*British Medical Journal*, July 14th, 1888, pp. 72 and 73) says that he has safely administered this narcotic in many instances of cardiac disease of various kinds;

and he has since told me that the only cases which give him anxiety are those where there is marked arterial degeneration. These cases are a cause of anxiety whatever anæsthetic may be employed; and I agree with Dr. Day that if an anæsthetic of a general kind must be administered in cardiac disease, Methylene is as safe as any other. I do not myself make the administration of anæsthetics a speciality; but when I am concerned in the administration, it is almost invariably for patients who are, it is feared, particularly susceptible of danger owing to cardiac or other complication. I have, therefore, by this circumstance, been led to see it in action under the most critical conditions, and have not seen any serious danger from it. I quite agree with Dr. Day as to the propriety of tapping the abdomen before administering Methylene, when the abdomen is so filled with fluid that there is pressure on the thoracic organs.

DANGERS FROM METHYLENE.

In the practice of Sir Spencer Wells, in that of Dr. Day, and in my own, there has never been an untoward result from the administration of Methylene. But there have been a certain number of fatal cases in which it has been used, and in which death has either been produced by it or has been coincident with its use. This is precisely what I feared would be the case at the time of introducing it. I have often said, and I repeat the fact, now, that there are always a certain number of persons who constitute a class that may most correctly be designated the *MORITURI*, persons who under comparatively slight shocks are ready to die. These, under every anæsthetic that has ever been discovered, or mayhap ever will be, must yield a certain

mortality; as a matter of course, they will yield a mortality from Methylene, and if, for such unfortunates, we could find a new chemical substance that would affect them more favourably, it would be a great boon. For the moment I know not of one that combines so many advantages with so few dangers; and after twenty-one years' observation I stand in regard to it precisely as I stood at the moment of placing it in the hands of my professional brethren for their acceptance and fair judgment of its qualities.

POSTSCRIPT.

SPIRITUS METHYLENÆ.

In order to institute a comparison between Methylene and chloroform, let the practitioner make spirit of Methylene by mixing Methylene with alcohol in precisely the same proportions as in making spirit of chloroform, and then test the two solutions. It will be found that the spirit of Methylene is much less pungent, softer to the taste and much pleasanter than spirit of chloroform; and that, while it is a more acceptable compound for the prescription, it possesses equal utility and facility as a medicinal remedy.

The formula for SPIRIT OF METHYLENE is :—

Methylene, 1 ounce; rectified spirit, 19 ounces.

Dose.—10 to 60 minims.

A COMPOUND TINCTURE can also be made, as follows :—

Methylene, 2 ounces; rectified spirit, 8 ounces; compound tincture of cardamoms, 10 ounces.

Dose.—10 to 60 minims.

THE ART OF EMBALMING.

THE LATEST METHODS.

IN the course of modern experience many changes have been introduced by which the various steps of the process of embalming have been much simplified. I now propose to describe, for professional service, the latest advances, and that so plainly that the youngest member of the medical body who has entered the field of practice may, by following what is told, be competent for the duty.

Up to the year 1875 the usual method of embalming was by exposing an artery, introducing into it a curved hollow needle, and injecting through the arteries the preservative solution. The solution was composed of chloride of zinc dissolved in water with the addition of alcohol.

Five pints of water at 50° F. were treated with the zinc chloride just up to saturation, and to this one pint of .830 alcohol was added, with two fluid ounces of the officinal hydrochloric solution of arsenic.

The mode in which the process of embalming with this solution was carried out is described in a lecture which I published in the *Medical Times and Gazette* of January 16th, 1875, as follows:—

EMBALMING SIMPLY—WITHOUT A POST-MORTEM
EXAMINATION OF THE BODY.

THE INSTRUMENTS REQUIRED.

The instruments required for modern embalming are few and simple. An ordinary post-mortem case is necessary, an aneurism needle, a tube for insertion into an artery, and a long, narrow-bladed bistoury. For the arteries the slightly curved tube which I introduced some years ago for transfusion of blood answers exceedingly well.

Another instrument required is one for throwing the preservative solution over the body, through the arteries. The old-fashioned flute-valved stomach-pump serves the purpose fairly, but a large graduated bottle which will hold six pints of fluid, and which can be fitted like a Wolff's bottle, is preferable. When this bottle is charged with the fluid, the short tube, passed through the cork, can be attached to a double-acting india-rubber hand-bellows, and a long india-rubber tube can be connected with the exit-tube which comes from the bottom of the bottle. The long tube is armed at the free end with the artery-tube. After the artery-tube is fixed in the artery, the bottle is raised above the level of the subject, and then the fluid in the bottle will flow into the vessels by a gentle action of the bellows. By this method of transfusing the fluid, one hand of the operator is left at liberty; the fluid flows easily and rapidly, and the quantity of fluid injected is measured with ease and precision. It is well to put the fluid into the bottle and attach the long tube before going to the embalming; then the different steps of the operation can proceed without the delay otherwise incidental to the preparation. Whether this precaution be taken or not, the

solution should always be made some time before it is used, and should be quite ready for injection.

Before commencing to inject with the preserving solution, the body to be embalmed is divested of all clothing, and covered with a loose cloth or robe. It is laid recumbent on a table about two feet six inches wide, seven feet long, and two feet four inches high. A second smaller table, standing a foot or a foot and a half higher, for holding the bottle containing the embalming solution, is very convenient.

If the rigor mortis have not yet passed off, the limbs of the subject are gently flexed and extended until relaxation takes place.

Some operators lay the body to be embalmed in a hot bath before they commence to inject the vessels. This is often done here by those who inject subjects, for dissection, with solutions of wax; and for the latter purpose the plan is useful. In embalming, the bath is really unnecessary, and the additional trouble of it is very great, although the fluids run more easily through the vessels when the bath is used. Should the operator, therefore, not mind the trouble, he may place the subject in the bath, but he must be careful to keep the temperature of the water under 140° F. If that temperature be exceeded, he will produce so much muscular and vascular rigidity that the flexibility of the vessels he was seeking to secure will not be obtained. On the contrary, the vessels at their peripheral extremities will contract and resist the injection firmly, and it will be found difficult to force the fluids through the round of the circulation.

MODE OF INJECTION.

The subject prepared, as above directed, the operator must determine on an artery through which to inject. In cases where the upper limbs are well developed, the brachial artery may be selected, the vessel on the right side being the most convenient. If the upper limbs be not large, it is a saving of time to select the femoral artery in Scarpa's space, for often under such circumstances the brachial is not found of a convenient size after it is exposed, and then the opening that has been made has to be closed, and the femoral artery has to be exposed afterwards. Should the brachial be the artery selected, it must be laid bare in the upper third of its course, in the same way precisely as if it were about to be tied there. It should be exposed for a full inch and a half, and should be well lifted up from the surrounding parts. A small opening should then be made in the line of the vessel, and the injecting tube inserted; the point of the tube should be pushed into the artery towards the heart for a distance of an inch and a half at least, and then it should be tied in two places an inch apart. The tube may, finally, be tied down to the arm with a portion of tape to keep it firm in its place. When the tube is thus inserted into the artery, and fixed there, it is advisable, as a preliminary step, to attach the double-acting bellows to the tube, and to inject into the arterial vessels a gentle current of air charged with vapour of ammonia. It is easy to effect this by simply drawing the air with which the bellows are filled from the neck of a bottle containing a few drachms of strong solution of ammonia. This injection of alkaline air renders the after-injection of fluid less resistant, and the ammonia is itself an antiseptic of considerable value.

HARVARD UNIVERSITY
SCHOOLS OF MEDICINE AND PUBLIC HEALTH
LIBRARY

Disconnecting the hand-bellows from the tube that is in the artery, the operator proceeds to connect them with the short tube of the Wolff's bottle, and next he connects the india-rubber tube, attached to the long tube of the bottle, to the tube that is tied in the artery. In this way the communication for the injection of the preserving fluid into the arterial system is completed.

By the action of the bellows the operator proceeds, from this stage, to press the fluid into the body through the arterial circuit. He can hardly press too slowly or gently; and, if after the first pressure the fluid begins to run in of its own weight, so much the better. The most successful injections are those where the force employed is the least. If the fluid is entering the vessels properly and filling them, the proof of the fact is obtained by making a few strokes with the bellows, and feeling at the same time for the motion at some part of the body where an artery is near the surface. If the radial artery, for instance, be felt for at the wrist in the arm that is untouched, he can detect the motion with each stroke of the bellows precisely like the living pulse itself. Or if a stethoscope be placed over the base of the heart, with each stroke of the bellows the tension of the semilunar valves can be heard as they are driven down tense by the pressure of the fluid upon them. There is heard, in fact, a sharp second sound. From either sign, pulse or heart-sound, if it be present, it is clear that the injection is passing properly into the tissues.

When from a pint to a pint and a half of the fluid has been thrown into the arteries, one or two needle punctures are made in the extremities, through which punctures a little of the injection may escape. This operation serves two purposes: it shows, so soon as

fluid is presented at the openings, that the whole of the tissues are being charged; and by allowing for escape of a little fluid it prevents rupture of vessels within the cavities. The loss of an ounce or two of fluid from the punctures makes no difference in the success of the embalmment.

As the fluid completely charges the organs and structures of the body, a change begins to appear on the surface of the skin after from four to five pints have been introduced. The change usually commences in the face, but soon extends over all the surface of the skin, and it consists of a white mottling of the parts. The white-looking points run in irregular groups, each white spot being about the size of a split pea; and the spots, when they are felt, are hard. They do not in any way disfigure, and after a time they disappear.

When the mottling is present in various parts of the body, the indication is given that almost sufficient injection has been introduced. A pint more may, however, be slowly injected, and then the process may cease, at all events for a time. To carry out all the steps of the embalmment so far, a period of two hours is required.

This stage of the embalming reached, an interval of at least six hours is allowed in order to permit of the perfect diffusion of the preservative fluid through all the tissues of the body. Six hours is named as the shortest time necessary, but there is no objection for the time to be prolonged nine or twelve hours. If it is quite convenient, it is, indeed, as well to perform the injection at the close of the day, and to leave the body until the following morning. The arterial tube should be left in the artery, and the conveying tube

should be left attached to the injection-bottle, so that fluid may continue to enter by its own pressure.

After the body has been left in the manner described, and for the period named, it will be found, if the embalming has succeeded, very white over the whole of its surface, and exceedingly hard. The mottled appearance will have passed away, and will have been succeeded by a general marble-like whiteness. The muscles will be rigid, and the limbs fixed. The body, practically, will have been turned into an almost stony hardness; but the features will be retained with wonderful perfection, and even the expression of the face may be considered singularly lifelike. Usually the muscles of the face, by which expression is marked, set very firmly; and friends, as a rule, identify the expression as like one that was common to the face during the existence of life. In this state a cast may be taken from the face with advantage.

The complete solidification of the tissues of the body makes perfect the process of injection; but it is not in every instance the fact that the diffusion is immediately completed, and many circumstances may interfere with the general distribution of the fluid. Some of it may have escaped by a rupture of vessel into the cavities, and so out of the tissues; and sometimes, from a cause not easy to understand, the process of hardening of the muscular fibre and of the skin may not progress in the usual way, and the limbs may remain flaccid. Under such circumstances the injection-bottle must be recharged with the preserving fluid, and the injection must be repeated in the same way as before. It is very uncommon for this second process to be called for.

Presuming, then, that the complete rigidity has been

obtained, and no further injection is wanted, the operator may proceed to close up the artery through which the fluid was introduced. A very simple plan effects this object. Before removing the tube from the artery he disconnects it from the india-rubber tube that goes to the bottle, attaches to it another and fresh piece of tubing, and then with a syringe injects into the artery a few ounces (four to six ounces are sufficient) of a saturated watery solution of silicate of soda. As the silicate comes in contact with the remaining chloride of zinc left in the artery it undergoes the most perfect coagulation, and leaves the arteries full, for several inches, with a firm colloidal plug. After this the arterial tube may be removed, the artery may be tied firmly, and the opening through the skin may be neatly closed with silk sutures. If the stitches be carefully made in the form of the common anatomical stitch, hardly a mark need be left to show the point where the artery had been exposed.

It has been said that in some subjects, owing to the smallness of the upper limbs, the brachial artery does not answer for the injection. In such an instance the femoral artery should be chosen. The operation is precisely the same as that which is performed on the living subject in Scarpa's space for ligature in cases of popliteal aneurism. The femoral artery is found more easily than the brachial, as a general rule, and the arterial tube is more easily inserted into it. It is, I doubt not, from these facts that the femoral artery is most frequently selected by the professed embalmers. The arterial tube is directed into the artery with its point towards the abdomen; it is inserted for the full length of an inch or an inch and a half, is strongly tied with two ligatures, and afterwards firmly bound to the

limb with a band of tape. The other steps of the process of injection are the same as have been described: the fluid is injected towards the heart, and after the body has hardened sufficiently, the vessel, plugged with silicate, is tied. The opening through the skin is closed neatly with the silk suture.

AFTER PROCEDURE.

So soon as the embalmed body is sufficiently solidified by the hardening and preserving fluid, certain other minor but still important details have to be carried out. It will be found usually that the cavity of the abdomen is left somewhat distended with gas. To remove this it is necessary to insert a pointed hollow needle and make the gas escape through it. This is effected by pressing firmly on the abdomen until it is emptied, after inserting the hollow needle; but since the introduction of the aspirator syringe that instrument is best for the purpose. The emptying is continued until the abdomen has fully collapsed; and if any difficulty is experienced in carrying this out, it may be requisite to make an incision through the intestines. This is done by the use of a long, fine bistoury, the blade of which can be introduced at the needle-opening into the cavity. A few movements of the blade of the knife, internally, are sufficient to lay open the canal for the escape of the gaseous matter.

When the abdominal cavity is emptied, the hollow needle should be thrown away, and the body should be dissolved in zinc chloride in collodion. A proportion of five parts of alcohol and one part of collodion. The plates of collodion should be used, and the mucous secretions should be removed.

membrane. The opening made into the abdomen with the needle or bistoury is closed with a stitch of silk.

From the abdomen it is necessary to proceed to the thoracic cavities, into each of which the hollow needle should be passed in the anterior aspect between the third and fourth ribs. Through the needle four ounces of the zinc colloid should be injected into each cavity.

After the body is perfectly embalmed, and the openings that have been made into it have been neatly closed, it should be swathed very evenly in bandages that have been saturated with carbolic colloid, made by dissolving carbolic acid in collodion in the proportion of twenty grains of the acid to the ounce of collodion. The bandaging should commence at the feet, each lower limb being separately encased; above the hips the bandages should cross, and should be passed in alternate crossings so as to encase the trunk quite up to the neck. At this point they should again be made to diverge, and should be extended down the arm on either side to the wrists, where each should terminate. The hands and face are left exposed.

The attendants may now clothe the body, and dress and arrange it as they please, which processes finished, the removal of the body to the casket in which it is to lie should be effected as quickly as is convenient. Should it be intended to convey the embalmed body by sea, one additional precaution is essential: the casket must be closely packed between the body and the lid with layers of blanket or pillow. This prevents concussion from the motion of the ship.

The body can be retained in a closed casket for any length of time without any fear of its undergoing change from decomposition.

NEEDLE EMBALMING.

Since the publication of the directions given above, and which some may still think describe the best mode of embalmment, a radical change has been made in the process, a change introducing by far the most practical, the most simple, and in every sense the best method. I call this the *needle process* because it brings into use no instrument of a cutting kind except a hollow needle of the same kind as for hypodermic injection but of a rather larger size than that which is commonly employed. This new plan is advanced by the experiment, described in the first ASCLEPIAD, of injecting the vascular system by and through the cerebro-spinal cavity. It appeared from the results of that experiment that the dead body might be injected over the whole of its surfaces by the needle without making any incision with the scalpel. The needle method reduces the art of embalming to a process of the simplest order, one less objectionable to the operator than conducting an autopsy; and, it leaves no mark or sign of injury whatsoever.

DETAILS OF THE NEEDLE PROCESS.

The solution used is not widely different from that named on page 212. For embalming a body of the weight of one hundred pounds, the following solution is required:—

500 grains of zinc chloride, dissolved in 3 pints of methylated spirit, to which is then added 1 pint of .830 ethylic alcohol and half a pint of chloroform containing, dissolved in it, 120 grains of benzoic acid.

This solution should be prepared beforehand, and may either be put into the injecting bottle already

described, or carried in a wide-mouthed vessel, from which an injecting syringe can easily be charged.

For the purpose of injection a series of hollow needles is required. The longest needle should be six inches in length, the shortest three, and it is well to have one of intermediate size. The needle in use should be attached to a strong india-rubber tube a sixth of an inch in diameter, and connected at its other end with the injecting syringe. The syringe should be capable of holding five fluid ounces, and should be in good working order. If it has a double valve, so that it can be filled by the exhaust pull from an extra tube and discharged through the needle by the down-push, after the manner of the ingenious syringe invented by Dupaul, so much the better; but really any good syringe will answer.

The syringe being charged, the operator commences to inject the cranial cavity. To do this he passes the long, hollow needle through the conjunctiva at the inner canthus of the eyeball, and, directing it almost straight backwards, carries it into the cranial cavity. An assistant then gently injects the preservative fluid, using no force and taking abundant time. He will thus be able to introduce four syringe-fuls into the cranial cavity without difficulty. This effected, the needle is withdrawn carefully, is introduced into the opposite side of the cranium, in the same manner, by the inner canthus of the other eyeball, and four syringe-fuls more of fluid are also injected, after which the needle is again withdrawn. Two pints of the preservative solution have now been thrown in, and have been carried by the veins all over the tissues, a fact that will often be shown by the veins of the hands or of the lower limbs becoming distended.

Two syringefuls—five fluid ounces—of the preservative fluid are next to be injected into the right cavity of the thorax through one of the intercostal spaces, the same quantity into the left thoracic cavity, and the same into the left cavity of the heart, which can easily be reached by insertion of the long needle. The abdomen, relieved of gaseous substance, after the manner related in the preceding section, is next made to receive into its cavity the fourth pint of the solution. Finally, with a smaller needle the last remaining pint of the solution is subcutaneously injected, in the proportion of three ounces for each upper extremity at different points, four ounces for each lower extremity at different points, and the last six ounces over various parts of the trunk of the body. As a general rule, the proportions of fluid specified are quite sufficient for an adult subject, the quantities being reduced or increased according to weight; but there is no harm done by subcutaneously injecting another pint of the preservative or by throwing a pint more of it into the abdomen or into the cavities of the chest or heart.

When these injections have been neatly made, not a trace of mark or of disfigurement is left, and the whole process may be completed in an hour. Afterwards the body is very carefully swathed in a series of bandages saturated with the following solution :—

Pure tannin, 250 grains; ethylic alcohol (sp. gr. .830), 10 fluid ounces; collodion, 9 fluid ounces; balsam of tolu, 1 fluid ounce; gum benzoin, until it ceases readily to dissolve.

This makes a solution of the consistency of glycerine, which is adhesive, is readily absorbed by the substance of the bandage, and gives out a fragrant odour.

The best substance for the bandage is that kind of

porous flannel used for lining dresses and called *domette*. The bandage should be about three inches wide, used in lengths of six yards each, and should be firmly and very evenly applied. The body, duly arranged by the attendants, should then be laid at once in the casket that is to receive it; and if it has to be sent away a long distance, it should be closed up entirely from the air, after two fluid ounces of benzoated chloroform (described at p. 239 of this number) have been sprinkled or sprayed over the garments in which it is enshrouded, and after it has been covered with some soft pillow substance or blanket, in order to save it from mechanical injury incident to movement during voyage or travel.

CONDITION OF THE BODY TO BE EMBALMED.

The condition in which the body exists before it is embalmed makes a material difference in the success of the process. In some instances it is essential to open the cavities of the body, although a post-mortem may not be demanded. If in any of the cavities there be a large vascular tumour, or a cyst, or a great enlargement of some particular organ, it may be necessary to remove such diseased part, or to empty it. In a case of empyema, or hydrothorax, or ascites it is requisite to empty out the exuded fluid; in the case of a large cancerous tumour in the abdomen, or of an enlarged liver, it is necessary to remove the structure altogether. Such structure may afterwards be divided into portions, saturated with the preservative solution, and returned into the body.

The most difficult subjects to embalm are those who have died with general anasarca. In these cases it is exceedingly troublesome to inject a free current of the preservative fluid. It is also difficult, where there is

anasarca, to determine how much preserving fluid will be required in order to sustain the necessary preservation ; but the needle process renders these difficulties much less formidable than they were.

As a rule, the best period for embalmment is about twenty-four hours after death, unless there be circumstances present which are leading to a rapid decomposition. At the end of twenty-four hours the rigor mortis has passed away, and the process of injection is readily carried out.

The fact of commencing decomposition is no actual obstacle to the process of embalming, though it is decidedly objectionable. The parts that have become discoloured by the putrefactive changes are often restored in a remarkable manner to their natural colour when the injecting solution has fully permeated them. All the impure odours that arise from putrefaction are removed by the embalming, and all further putrefactive change is effectively prevented.

ALLEN'S SURGICAL PUMP AS A NEW INSTRUMENT FOR USE IN EMBALMING.

Whilst this paper has been going through the press the new instrument named above has been brought under my notice by Mr. Truax, of Chicago.

This instrument consists of a metal cylinder, upon the inner surface of which is coiled a single loop of rubber tubing, turned in the centre of a piece a yard or more in length.

A shaft having a suitable crank passes through the cylinder, to which is attached a roller provided with springs so arranged that any degree of pressure desired can be made by it on the tubing (see Fig. 1). By

properly adjusting the springs each revolution of the crank will displace as much air or liquid as is contained in that portion of the rubber tubing forming the loop. As the roller in passing around the circle must rest on the tubing, completely closing it at some point, there is

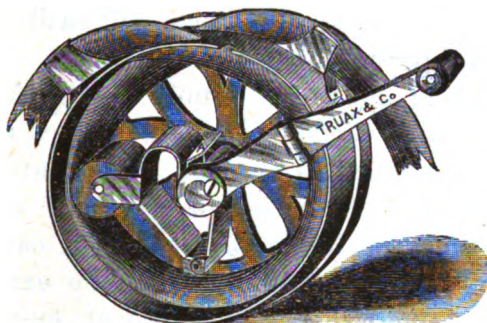


FIG. 1.—SHOWING THE RUBBER TUBE COILED WITHIN THE CYLINDER.

no necessity for any valves and if one end of the tubing be attached to a vacuum bottle and the crank be turned so as to force the air in the tubing in the opposite direction, a powerful vacuum will soon be formed, and

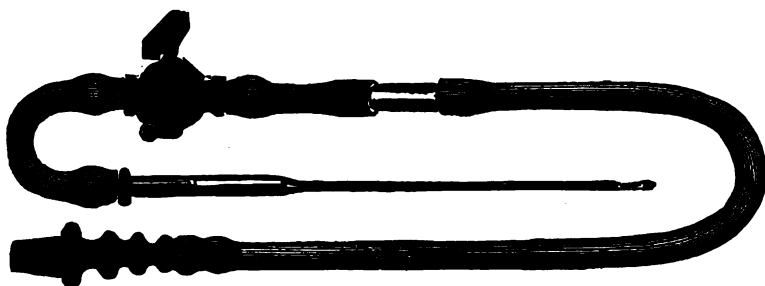


FIG. 2.—SHOWING ASPIRATORY ATTACHMENT.

a good aspirator supplied; or if the same end be attached to an air receiver and the crank turned toward it, a high pressure of condensed air will be obtained. This apparatus is adapted for pumping both gases and liquids, and is either a force or vacuum

pump, depending only on the direction in which the crank is turned. It has no valves or stopcocks, and the current may be instantly reversed. It has sufficient power to force a column of water to a height of one hundred and sixty feet, maintaining it at that height, and the next to the smallest size will easily pump one quart of liquid per minute.

This injecting apparatus is now used in America for embalming, and is without doubt a perfect exhaust or forcing syringe for this, as for other purposes. In order to empty the cavities of the body of fluids or gases, the inventor has added what he calls an embalming trocar, in describing which he explains that in order to convert the syringe into an embalming instrument it is furnished with a pointed evacuating tube (see Fig. 3); and as this pump works with much greater



FIG. 3.— EMBALMING TROCAR.

force than any other evacuating instrument, there is much less danger of the tube becoming clogged. Moreover, should clogging occur, the operator has only to give the crank one or two turns in the opposite direction to free it at once.

The syringe can be affixed firmly to the upper rail of the back of a chair. To the syringe other tubes can also be attached for injecting the arteries, or for that process of needle embalming which has now for the first time been described, and which is the latest development of one of the most ancient arts.



OPUSCULA PRACTICA.

"There are mites in science as well as in charity."

BENJAMIN RUSH.

THE ETHYLATES OF SODIUM AND OF POTASSIUM IN THE TREATMENT OF NÆVUS.

INQUIRIES are frequently sent to me from different parts of the medical world asking for more information on the manufacture and practical use of the ethylates in the treatment of nævus and other vascular growths. The subject is deserving a longer paper than I am accustomed to give in this department of the ASCLEPIAD; and, one day such a paper, which I have not the time at this present moment to write, shall be published. Meanwhile the following epitome may help to answer many of the inquiries that have come to hand.

MODE OF PREPARATION AND GENERAL PROPERTIES.

Sodium Alcohol, or Ethylate of Sodium.—This ethylate is prepared by treating absolute alcohol with pure metallic sodium. So soon as the sodium comes in contact with the alcohol there is free escape of hydrogen, and the addition of sodium has to be continued until action ceases. I find it good to increase the temperature gradually as the action declines. At last there

is obtained a thick, nearly white product, which is a saturated solution of sodium alcohol. From this solution ethylate of sodium crystallizes out in beautiful crystals, which are soluble in pure alcohol.

The composition of sodium ethylate is $\left. \begin{matrix} \text{C}_2\text{H}_5 \\ \text{Na} \end{matrix} \right\} \text{O}.$

When it is brought into contact with water, it is decomposed, the sodium becoming oxidised by the oxygen of the water to form sodium hydrate, and the hydrogen of the water going to reconstitute the common or ethylic alcohol.

The change of ethylic alcohol into sodium ethylate transforms it from an irritant to a caustic. Laid on dry parts of the body, the sodium ethylate is comparatively inert, creating no more change than the redness and tingling caused by common alcohol; but so soon as the part to which the substance is applied gives up a little water, the transformation I have described above occurs; caustic soda is produced in contact with the skin in proportion as water is eliminated by the skin, and thereupon a gradual destruction of tissue proceeds, which may be so moderated as hardly to be perceptible, or may be so intensified as to destroy almost like a cutting instrument.

Potassium Alcohol, or Potassium Ethylate.—Potassium ethylate is made in a similar manner to sodium ethylate, viz., by bringing pure potassium into contact with absolute alcohol. The action of the potassium is much more energetic than sodium. I prefer to immerse the potassium under the alcohol in a small glass bell, from which there is a tube to allow of the escape of the liberated hydrogen. When saturation is complete, a thick and almost colourless fluid is formed, from which the ethylate may be obtained in solid crystalline state.

Exposed to water, the potassium ethylate is transformed, as is the sodium ethylate, into ethylic alcohol and hydrate of potassium. The composition of the potassium alcohol is $\left. \begin{matrix} \text{C}_2\text{H}_5 \\ \text{K} \end{matrix} \right\} \text{O}$.

The action of this compound on animal tissues, living and dead, is the same as that of the sodium compound, but is more energetic.

PRACTICAL APPLICATION.

As a rule, I employ the sodium ethylate in practice, but I have many times used the potassium salt in cases where it was important to destroy a structure very promptly. Whichever of the preparations is employed, it should be in a solution made by saturating the alcohol with the element until a solution of Sp. Gr. .880 is obtained, or by the addition of absolute alcohol to the crystallized salt until a solution is made of the same specific gravity. The solution should be kept in a cool place apart from the light. Originally I recommended that in applying the solution a glass rod should be used, and with the potassium ethylate this is still advisable; but with the sodium solution it is not necessary; a good camel's-hair pencil is all that is required.

In treating nævus, I first dry the surface with a piece of cotton wool; then with the brush I thoroughly coat the dried surface with the solution. The application causes, always, some effusion and redness, accompanied by a little pain, expressed by those who are old enough to describe it as a burning sensation, like the sting of a bee or a nettle. After a short time there is an exudation of water, in drops, from the red surface, which exudation lasts for a few minutes, and is followed by dryness, and sometimes by pallor or duskiness of appear-

ance. In the course of four or five hours a scale begins to form, and continues until there is quite a hard crust, which completely covers the nævus, but through which the soft vascular character of the swelling can be detected. Originally, after it was formed, I allowed the crust to remain for a few days, then removed it with a wire scoop, and reapplied the solution over the red surface. The proceeding led to a rapid cure, but it was so painful as to demand the use of a general anæsthetic. I have, therefore, given this up for a mild and sure but rather slower method. After the first crust is fully formed I pass through it on the third day a fine needle with cutting edges, shaped like the old cataract needle—described in ASCLEPIAD, Vol. II., p. 254—and with this I break up the vascular surface underneath, and on withdrawing the needle make firm pressure with lint on the upper surface. A large drop or two of blood flows out freely, but further escape is easily controlled by a dossil of lint charged with styptic colloid. When the bleeding has quite ceased, a drop of the ethylate solution is inoculated into the nævus through the punctured opening, a new layer of it is painted over the crust, and the crust is left as it was. The crust may be left four days more; and if at that time the vascular softness still remains under it, it must be treated by puncture and re-injection just as before. When at last the crust feels firm and dry beneath, the cure may be considered as complete, and the crust may be left to scale off by itself, leisurely.

In the treatment of raised nævus by this plan, I have never seen the least untoward symptom of moment, and although some cases have been rather more tedious than others, there has not been one failure of cure. In fact, I have come to look on the method as specific for the

ordinary raised circumscribed nævus. In respect to the smooth, diffused nævus, commonly called "*mother's mark*," or "*port-wine stain*," I have not so good a report to offer. I have twice succeeded remarkably in the cure of this form of vascular affection, but I have several times failed, and in some instances, as already related in the ASCLEPIAD, the treatment has given rise to a true cheloid, which has been most difficult to remove, and has not improved the appearance. For these cases, therefore, until I understand it better, I do not press the ethylate treatment, except the affected patch be small and be slightly raised above the surface.

THE CURE AND PREVENTION OF LANGUOR.

IN ordinary states of health the strongest persons are apt to feel sensations or fits of languor which they call fatigue, and for which they can give no reasonable explanation either to themselves or to others. The weather largely influences this condition. A moist and warm atmosphere always increases the disposition to languor; a moderately cold and dry atmosphere greatly prevents it. The sense of relaxation and disposition to sleep must not be confounded with true fatigue, arising from hard or prolonged physical or mental work, but must be taken as simply due to a condition in which there is weariness without a sufficient reason for it. When this condition is strongly present, it is marked by one particular sign, which is of itself characteristic it comes on after repose. The affected person experiences it most on rising in the morning, and even after

a good night's sleep is still oppressed by a sense of weariness, a feeling as if the day, with all its cares and anxieties, could not be passed through. The desire, almost irresistible, is to go to sleep again, a desire which, if gratified, increases the evil and makes the day heavier than it otherwise would be. That it is not real fatigue or exhaustion which causes the sense of languor now being described is clearly shown, not only by the fact that the feeling comes on after long repose, but that it is dispersed in the day, after it has been present in the morning, by the exercise and duties of the day. I have no doubt that it is caused by the accumulation in the body of some diffusible and light chemical substance, which acts after the manner of an intoxicant, and is a true intoxicant to the nervous system.

The probable physiology of the condition is plain, but what is to be the cure, and, above all, what is to be the prevention? The cure is exercise and the wearing of clothing which will give free liberation to the exhalations of the skin. Every one who is affected with the sense of languor is soon conversant with the knowledge that if he resolves to throw off the load which oppresses him and takes a short, sharp walk or other good and wholesome exercise, he is always relieved, and many find this mode of cure so certain that they invariably follow it. Others, and I fear the majority, are so oppressed that they feel as if they could not bring themselves to the effort of throwing off the sense of weariness by resorting to anything like active motion. When the oppression is strongest and exertion is most demanded, they try to balance betwixt the two modes of treatment, the sharp exertion and the seductive sleep. They give way to the sleep;

the giving way becomes a habit; in a very short time the habit lapses into a confirmed method, and with the habit structural changes in vital organs of the body are soon set up, and add rapidly to the evil. The body becomes obese, the liver becomes inactive, the mind becomes dull, and a short life is, of necessity, determined.

The treatment of languor in the healthy consists, then, in taking exercise in due, but in moderate, amount. To go in for desperate exercise, as some do, is to frustrate, not to assist, cure; for desperate exercise produces actual fatigue, which nothing except rest will cure, and then the weariness from actual overwork and the weariness from underwork get confused the one with the other, and all goes wrong.

Rightly conducted, the cure is exercise, and the prevention is continued exercise carried out daily and regularly, whatever the temptation may be to give it up. Second to this is light and porous clothing, as I have many years taught. Whatever holds or takes up the fluid exhalations from the skin is not clothing fit to wear. Whatever cannot be easily breathed through is not clothing that is fit to wear. No kind of clothing for the human body is so good as that which admits freely into and through its meshes the most perfect purifier and the most perfect non-conductor and healthy equalizer of temperature known—atmospheric air.

Patients sometimes come to me literally borne down with the weight of their clothing. They are coated with three or four layers of heavy and close materials. These materials are saturated with the moisture from the skin, are unduly heavy, are always damp, if taken off, for a short time, leave exces-

sive cold, and if kept on too long, induce oppressive heat; all round mischiefs of sure and certain development. A fairly healthy person who takes reasonable outdoor exercise daily, and who clothes himself lightly in porous material, will feel no weariness except that which comes naturally from healthy fatigue.

ON TAPPING FOR ASCITES.

IN tapping for ascites I have long practised a little plan which saves a great deal of trouble, and without any extra apparatus entirely prevents the entrance of air into the abdominal cavity. I slip over the end of the canula a piece of india-rubber tubing, and turn the surface of the tube over the end so as to make a flat surface of rubber. I then push the trocar through the rubber, and make it go right home. There is no difficulty in the process whatever, and no interference with the entrance of the trocar through the tissues when the puncture is made. On withdrawing the trocar the opening through the soft rubber closes of itself, and the escaping fluid runs readily through the length of tube into any utensil that may be placed to receive it.

In my early days of practice the almost universal custom was to use a large trocar and to draw off the fluid as rapidly as possible. Under this plan it was necessary to make provision for compressing the abdomen by the bandage, as the body quickly collapsed, in order to prevent the occurrence of syncope from sudden collapse. The practice was bad, and for many years I have substituted for it the employment of a

small trocar, only introducing a large one if the fluid that may flow be too thick and glutinous to pass through a tube of narrow calibre. With a small tube conveying a stream of not more than the eighth part of an inch in diameter, the evacuation of the cavity is slow; but the operation is unattended with any sign of faintness except from fear or mental nervousness on the part of the patient.

To prevent pain in the operation I always use ether spray for benumbing the surface at the point of puncture. It is well to freeze over a space of a disc an inch in diameter, and when the part played on by the spray is quite frozen to put the point of the warm finger on the spot in the centre of the disc, where the puncture is about to be made, so as to soften the frozen skin. This does not restore the sensibility if there be left plenty of frozen tissue around. I have used the spray in this manner thirty times, for tapping, have never failed in rendering the operation perfectly painless, and have never had any untoward result. One patient whom I tapped seven times, and who became accustomed to look on the proceeding with the most perfect unconcern, told me that she was at no time conscious of any sensation beyond a slight jerk which was not at all painful. It may therefore be supposed that the peritoneum, as well as the skin, is rendered insensible to the pain of the puncture. In freezing with the spray it is best to proceed slowly, devoting five minutes to the process, so as to ensure deep local anæsthesia.

THE INFLUENCE OF THE MIND ON THE PULSE.

THE idea that the circulation is very much influenced by the action of the mind, and that to some extent unconsciously, is of common acceptation; but the truth of the idea is never properly realized until the *litera audita eb scripta* of the circulation are known. When I first began to use the sphygmophone with the microphone attachment, the loud sounds which the pulse movements caused were heard by the patient, and were so distinctive that they created a certain deviation in the action of the pulse, so that, at last, I was compelled to give up the use of the microphone and to take the readings from the simple friction of the needle on a piece of parchment stretched across the path of the needle, and communicating with the ear by means of two india-rubber ear-tubes. I have observed the same perturbation of the pulse when taking the readings with the sphygmograph, but not in so marked a degree, except in persons of a very observant nature and of a peculiarly sensitive turn of mind.

The effect of the mental influence on the pulse is in almost every instance to quicken the action of the pulse at first, and sometimes to make it irregular. The quickened condition does not last long, and it is, perhaps, invariably followed by slowness and decided feebleness. When the action of the circulation is slow and irregular before the reading is taken, the mental excitement, whilst quickening the action, may also render it for a time more regular; but this effect does not last long, and it is followed by more serious depression than previously existed, and by more determinate irregularity. In brief terms the influence of the mind on the circula-

tion is simply that of a stimulant, and is singularly like that of the best-known stimulant—common alcohol. The mental stimulus and the alcoholic stimulus are, indeed, so ridiculously alike, it is difficult to distinguish the one from the other.

Once or twice I have noticed a different result from that named above. I have seen the effect of the mind all at once so intense that there has been no stage of stimulation. In these instances the depression has been declared instantly, and symptoms like those of syncope have been immediately indicated. I have also known precisely the same from chloroform and even from alcohol. In such examples the tension of the circulation is either very great, or the heart is so feeble that the slightest excitation is sufficient to overpower it. The one point of practice to be gained from these observations is that in order to get a true and reliable reading from the pulse, either from the sphygmophone or from the sphygmograph, it is necessary to proceed without letting the mind of the patient take active part in the process, unless it be desired to ascertain if the circulation can bear an extra strain and what is its behaviour under the test.

BENZOATED CHLOROFORM.

IN addition to its anæsthetic properties, chloroform is very useful as an antiseptic. It is also useful as a solvent of various antiseptic substances. A most useful solution can be made with it, which may be called *Solution of Benzoated Chloroform*, or, simply, *Benzoated Chloroform*. To make the solution:—Take three drachms of pure

benzoic acid, and add this weight of the acid to twelve ounces of pure chloroform. The acid will all be dissolved in the chloroform. If there be any residue, filter the solution, and it is ready for use. The solution will keep unchanged for any time, and is available for a variety of purposes. The solution is antiseptic, deodorant, and odorant. I always have a three-ounce bottle of it with me at a post-mortem examination, and after washing my hands and drying them, take a little of the solution into them in the same manner as we use *eau de Cologne*; the chloroform evaporates, and the benzoic acid is left equally diffused over the skin, removing quickly all organic odour and leaving in its place the extremely pleasant odour of the benzoin. At the post-mortem, again, it is very good practice to spread a little of the solution, on cotton wool, about the room. If it be requisite that the burial of a dead person must be deferred, the solution sprinkled over the cerements forms a good temporary preventive of decomposition.

In practice I have found the benzoated solution of considerable service in the treatment of foetid wounds. In a case of foetid ulcer of the lower extremities, after the bandage has been applied I direct that from time to time a fluid drachm of the solution shall be poured on the bandage over or near to the ulcer, and the deodorizing effect is of the best character. The solution is also the most effective I know of for removing the foetor in troublesome cases of foetid exhalations from the feet.



RENÉ·THEOPHILE·HYACINTHE·LAENNEC
M.D.

*Portrait from Sir John Forbes'
Life of Laennec. 1827. B.M.*

Asclepiad. No 14. Vol. V. London August. 1888.

THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
500 FIFTH AVENUE, NEW YORK, N. Y.

THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
500 FIFTH AVENUE, NEW YORK, N. Y.
The following is a list of the
books in the collection of the
New York Public Library, Astor
Lenox Tilden Foundation, New
York, N. Y., which are now
in the possession of the
New York Public Library, Astor
Lenox Tilden Foundation, New
York, N. Y., and which are
now in the possession of the
New York Public Library, Astor
Lenox Tilden Foundation, New
York, N. Y.



John F. Kennedy
1957
Washington, D.C.

*RENÉ THEOPHILE HYACINTHE LAENNEC,
M.D., AND THE DISCOVERY OF MEDIATE
AUSCULTATION BY THE STETHOSCOPE.*

THE FIRST ACCOUNT OF A GREAT DISCOVERY.

“**I**N 1816 I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. The other method just mentioned—immediate auscultation—being rendered inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied, at the same time, that it might be turned to some use on the present occasion. The fact I allude to is the augmented impression of sound when conveyed through certain solid bodies, as when we hear the scratch of a pin at one end of a piece of wood on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a kind of cylinder, and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only

of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera, and, consequently, for the exploration of the respiration, the voice, the rattle, and perhaps even the fluctuation of fluid extravasated in the pleura or pericardium. With this conviction, I forthwith commenced, at the Hospital Necker, a series of observations, which have been continued to the present time. The consequence is that I have been enabled to discover a set of new signs of diseases of the chest, for the most part certain, simple, and prominent, and calculated, perhaps, to render the diagnosis of the diseases of the lungs, heart, and pleura as decided and circumstantial as the indications furnished to the surgeon by the introduction of the finger or the sound in the complaints wherein these are used."

The above are the sentences written by the man whose name stands at the head of this article, the illustrious Laennec, the discoverer of the process of mediate auscultation and the inventor of the stethoscope. They supply, in the briefest possible language, the history of the happy circumstance which led to the introduction of that knowing little instrument the stethoscope, for medical investigation, into every consulting-room of the world where medicine is practised.

"A wooden cylinder, a foot long, from eighteen to twenty lines in diameter, divisible in the middle of its length by a screw"—to render it conveniently portable—"pierced in the centre by a tube nine lines in circumference, but terminating at one end by a tunnel-like cavity, about an inch and a half in

longitudinal dimension, and of nearly an equal extent in diameter at its large extremity, with a sort of plug, itself pierced in the middle by a canal three lines in diameter, to be occasionally inserted into this tunnel, by which it is rendered a simple cylinder."

This is the description of the instrument used by M. Laennec, and to which he applied the now well-known name of "*Stethoscope*;" and this was the language in which the discovery of the stethoscope was brought before the medical profession of Great Britain on January 20th, 1820, on page 165 of the *London Medical and Physical Journal*, probably by Dr. Granville, F.R.S., at that time, and for two or three years later, the editor-in-chief of the one leading journal of medicine in this country.

The description of the instrument so supplied is followed by a commentary on the use and promise of it, in the same periodical. We ask ourselves in these days, How could we practise without the stethoscope? The predecessors of the practice to which it led were inclined to wonder what place and what good it would fulfil. Even at a later day, when the "listening tube" had got quite into fashion, there were pupils, and favourite pupils, of Laennec himself who said that were it not for the admirable manner in which the Master described the phenomena of thoracic disease, and added to the domain of pathology, the introduction of the stethoscope would have been a mere casual incident destined to come and go and bring forth no fruit.

There were also some who, after all the great truths respecting the value of the stethoscope were widely known, still looked upon it as a toy. One of the old practitioners, who in the first days of my

own career "did very well without the tube," and who looked on the process of "sounding the chest" as an agreeable way of spending the time, asked when I got my first new instrument whether I didn't "expect to hear the grass grow through it." Such is the incredulity respecting things which partake of innovation.

Laennec could afford to wait for the death of all these objections. He did not live to hear many of them, for in the prime of his life he died.

Laennec was the last of the few of the greatest of sons of genius of Esculapius. In this respect he followed Xavier Bichat, so that France has the double honour of producing the two real immortals of medicine of the whole of the nineteenth century. Considering the terrible troubles which France has passed through in the century, the depression she has laboured under from the tyranny of incompetent and pretentious emperors and kings, it is truly wonderful that her science in any department, and in medicine particularly, should have shown such a magnificent and exceptional record.

The difficulties with which the genius of sound innovation has to contend were never more fully indicated than in the first notice in English literature of the stethoscope. The writer regrets that Laennec should have laid out his work in such a mode as to make the principal object of his work the designation of "the advantage that may be derived from the use of the cylinder in distinguishing the different lesions of the lungs and rendering everything else subordinate to the design, the facts in pathological anatomy, although occupying a greater extent of space, being inserted merely as accessories." Under these impressions as to the value of the new means of diagnosis, the writer of

the critique actually reverses the order of his author, and lets the pathology engage his first attention, treating of the new means of diagnosis in a secondary way, "as it is treated of in medical writings in general." Two years later, when the work of Dr.—in later time Sir John—Forbes on Laennec, with a translation of Laennec's treatise, was under review, he (Forbes) was also complimented that he had grounded his arrangement on "pathological principles, which are unquestionably less precarious and less fleeting than those derived from diagnostic characters dependent on a new mode of instrumental exploration." In short, Laennec's work was looked on as a book of reference in pathology, and in this respect was ranked with the classic work of Morgagni, to which attention was paid in the last number of the ASCLEPIAD.

Such was the reception in England of Laennec's grand triumph; it shared, at first, almost the same treatment in France itself, quite the same in Germany and in America. It disclosed one of the purest and most individual discoveries ever made in the history of science; it called forth no jealousy; it had no suffering of rivalry; not a man got up and said, "I did that," not a man even got up and said, "I had thought before of this, but by some extraordinary accident did not make it known." No! The actual simplicity of the discovery, coupled with its overwhelming usefulness, concealed its greatness until its history was made, and its originator stood alone in his glory.

We are indebted to Forbes for the most concise and correct account extant of the life and work of Laennec. Forbes, in one of the few delightful hours which I was privileged in my young days to pass with him, told me that Laennec, when he was in his prime, was as much

distinguished by the simplicity of his manner as by the greatness of his character. No one was jealous of Laennec, but every one was sorry for him because in the midst of his devotion to the work of his life he suffered so acutely, and held to his duties with such unflinching zeal when his physical powers were quite unequal to the strain to which they were subjected. His students learned from him as if he and they were learning together. This same testimony was borne to me by other contemporaries: by the late Dr. Robert Willis, of Barnes, and the late Dr. Cowan, of Reading.

BIRTH AND EARLY DAYS.

The full name of Laennec was René Theophile Hyacinthe Laennec. He was a native of a little town called Quimper, situated in Lower Brittany, about a hundred and thirty-four miles north-west of Nantes. It is a busy little town, possessing a small harbour, and rather famous as a centre for the product of sardines, which are taken in large quantities in the sea off the neighbouring coast. The town is also celebrated for its cathedral, a Gothic building of the fifteenth century, and is well provided with schools and seminaries. The people of the place in the time of Laennec spoke a language peculiarly their own, which Laennec learned from his cradle, and which was more than once of practical service to him in after-life. He was born in Quimper on the 17th of February, 1781. His father, according to Forbes, who is supported on the point by the French biographers, was a man of very superior abilities. The father, an advocate by profession, was more than an advocate, for he was considered to be a good classical scholar and gifted with a poetic genius, which led him somewhat astray from the hard and

narrow path belonging to those members of the legal fraternity who stick to their calling as the one object of their lives. Forbes is inclined to rejoice that the talented son of this versatile lawyer was not led away by the same dominant genius; but it is more than probable that if the father had not been gifted even with a wandering genius, the son had been poor in that genius and gift of observation which made him what he became, one of the lights of the world of science and bearers of practical usefulness to mankind.

The details of the earliest education of Laennec are not recorded, nor does it appear that at first he was destined for the profession of medicine; it would seem, indeed, that he was intended for the Church, for whilst quite young he was sent to a little parish called Elian, near to Quimper, where an uncle of his, on his father's side, an ecclesiastic of some note, took him in charge and, for a time, superintended his education, instilling into his mind those early lessons which made him all through his life one of the devoutest sons of the Catholic Church that has Rome for its centre. The education he was receiving under this uncle was brought to an early termination by two causes: the first, the elevation of the ecclesiastic to a more distinguished place in the Church; the second, the after-changes in the Church itself as a result of the great Revolution, by which the clergy were generally dispersed and their benefices sacrificed. Laennec under these circumstances went from Elian to Nantes, where another paternal uncle lived in practice as a physician. Here our young scholar found a second father in one who was devoted to the science and art of physic, and who cultivated both, in combination with a wide and liberal learning.

In the commencement of his career at Nantes

Laennec pursued the general studies of the junior scholar, and distinguished himself by his industry, brightness of intellect, and excellence of disposition. The school in which he studied was in the department of the Lower Loire, and whilst there he made up his mind to accept medicine as the profession of his life.

Dr. Laennec at the time of his nephew's introduction into medicine was in marked repute in Nantes as a physician, and was senior physician to the hospital of the place. He was also Professor of Medicine and of *Materia Medica*,—two chairs which were often entrusted to one professor in those days,—in the Academy or School of Medicine of Nantes. The introduction, therefore, was of the best order, and afforded the student opportunities which were duly appreciated and duly sustained. He soon made his mark as a sound and observant student, and won the affection as freely as he gained the admiration of his compeers.

The political exigencies of the period, so critical in the history of France, caused the establishment in Nantes, as in other previously peaceable towns of the country, of a large military centre, in which many soldiers were lodged, for whom it became requisite to open efficient military hospitals. The military hospital system was a necessity of the disorder that was then in its birth, and being hastily brought into existence, was not very perfect in its organization. As many men as could be got at a moment's notice to act as medical officers were inducted into the service; and young Laennec, at the age of nineteen, a mere tyro and pupil, was passed into the office of surgeon to the troops. He acted for a while at Nantes itself, but was sent from thence into the west with a body of troops, in order to accompany them while

endeavouring to quell, not very satisfactorily, some disturbances which had arisen in the Morbihan district, a large tract of country, part of which lies on the shore of the Bay of Biscay, and in which Belle Isle, with many other islands, is included. He was as yet unqualified; and, probably for the purpose of completing his studies and taking up his degree, he left the service of the army in the year 1800, after about twelve months of military medical practice, and removed to Paris, attaching himself to the Clinical School of La Charité, and commencing to attend the lectures on anatomy and other classes in the School of Medicine of the great capital.

THE MEDICAL STUDENT.

The competition in the schools at this particular period was excessively active, and rivalry in the medical fraternity amounted really to a kind of civil war. The spirit of medicine moved with the spirit of the age; and men fought, and won, and lost in contests on the nature of disease and its treatment almost as furiously as they fought in the senate and the tribune about the political troubles in which the nation was plunged. Laennec took his side in these contests, but with singular good-temper and perspicuity of judgment. At La Charité he became the favourite of the distinguished master of physic Corvisart, whose works are, or at all events were, as familiar to English practitioners as to those of his own race. He remained under Corvisart for three years, and was so devoted to his clinical studies, that, according to Forbes, who had the statement from Dr. Meriadec Laennec, cousin of our great man, he drew up a minute history of nearly four hundred cases of disease.

In the period of his studentship Laennec made the warm friendship of the eminent medical scholar Bayle, who, as his senior, gave him the best advice and assistance. Between the two illustrious physicians there seems to have been an affectionate intimacy and communion of sentiment which made them as one in common fellowship for the common good.

THE PHYSICIAN AND PROFESSOR.

After a pleasant and industrious studentship, Laennec graduated as doctor of medicine of Paris on the 11th of June, 1804, and starting at once into practice, seems to have made his way rapidly into a first and fairly remunerative position. He was never greedy after practice, for the sake of the money which it might bring to him, but he quickly earned as much as he required for his simple tastes and pursuits. His private practice brought him at last about 25,000 francs a year, and to this sum he added for a few years 10,000 francs from the Faculty of Medicine for professorial work, with 5,000 from the College of France, and 4,000 from the Duchesse de Berri; in all, at his prime, about 40,000 francs, or something less than £2,000 of our English money. For this income he worked exceedingly hard, giving away a great deal of his time in gratuitous attention to the poor rather than to the rich; for when worn out with labour he would forego a call on the profitable patient, but never on one in want who demanded his attendance.

Directly after his graduation Laennec began the work of the Professor by opening up a course of lectures on pathological anatomy, in rivalry with Dupuytren, who was just then nearing the zenith of his fame. In this active part of his young life he

showed the originality of his powers by defining the diseases *Encephaloid* and *Melanosis*, not originally—for they had both been differentiated in this country—but quite originally in so far as he himself was concerned.

Of feeble and delicate constitution, Laennec suffered from overwork within a year or two after he commenced his active practical career, so that he was compelled to give up his pathological course in the year 1806, and from thence onward devoted himself to practice almost exclusively. He does not seem to have taken any prominent part in the politics of the time, but it has been said that he neither relished the vagaries of the Republic nor the brilliant despotism of Napoleon. This is what might be expected, for he was brought up in the old monarchical school, and looked forward to the restoration of the ancient line of kings of France and the revival of the Church. Nevertheless, when, in the ill-fated year of 1814, the pressure of war fell on Paris, and the hospitals of Paris were filled with wounded and half-starved soldiers, Laennec was to the front for the rescue. He volunteered his services to the hospital of La Salpêtrière, and shared with the rest of his colleagues the troubles and anxieties, in the practice of medicine, that are wrought by war. A touching anecdote is told by Forbes about Laennec during these sad months, an anecdote which deserves to be retold in all its truthfulness and all its simplicity.

“Among the young soldiers who at that unhappy period crowded the hospitals, overwhelmed at once with bodily fatigue and distress of mind, there happened to be a great number of conscripts from Bretagne, who did not know one word of French, and

whose sufferings, in consequence, were greatly and fatally aggravated by nostalgia of the worst description. These poor fellows were speedily congregated in the wards under the charge of Laennec, where they derived as much benefit from the care and kindness of their countryman, and from the delight of being understood and spoken to in their native language, as from the skill with which they were treated."

THE IMMORTAL DISCOVERER.

Two years later, after the fall of the first Napoleon, and after a certain hope of uncertain peace had come to Paris, Laennec was appointed as full or chief physician to the Necker Hospital. It was here that he made the immortal discovery with which this memoir was opened, and which threw a new light over the whole field of practical medicine.

So soon as the new discovery was made Laennec devoted two years to unflagging labour in following up the results of his happy revelation in diagnosis. No wonder! Did any man of physic in the whole history of physic ever drop upon such a rich field for research? Never. Possibly no man will ever again find the same mine of learning in an entirely new field. We have to read up the literature of pulmonary and cardiac diseases just before his time, to read the most advanced treatises, in order to obtain even an idea of the newness and fruitfulness of his labour. He roamed for two years in lines of discovery which forced themselves upon him, and which he could not miss had he so desired. The actual slight which his curious little instrument of research received was a fact in his favour, for it left him master of the scene, monarch of all he surveyed.

Day by day he was analysing diseases; separating one disease from another; tracing out the courses of diseases that had heretofore been inexplicably mixed; comparing the course of the general symptoms, which were well known, with the purely local or physical which were utterly unknown; and putting the two classes of symptoms together in their precise relationships.

With labour of this kind, so novel and so absorbing, he was compelled, by the circumstances of the position, to invent a new nomenclature, and in fact a new technical literature. His first attempt of the kind in giving a name to his new instrument of research was as fortunate as it could well be. No term could have been happier in sound, none more expressive, than *σθηθος*, the breath; *σκοπεω*, to examine—"Stethoscope." Hippocrates himself might have invented it, and would at once have understood it. Then followed the naming of sounds, natural and diseased, throughout all the respiratory divisions, and after them the sounds of the heart, internal and external. We hold the literature thus founded, the language thus invented, to the present hour; it is as familiar in our mouths as household words.

In June, 1818, Laennec laid the facts and results of his work before the Academy of Sciences. His memoir was received, the late Dr. Cowan told me, "with respect, but without the slightest trace of enthusiasm." That, at all events, was the account of the matter current at the time. The fact is not remarkable; it is rather in accord with the general sentiment, medical and purely scientific. The method evoked no jealousies, and therefore no enthusiasm. A toy had been introduced into the healing art, and would do no harm if it could do no service. It

was somewhat like the old housewife's opinion of her family adviser:—

“ Our doctor is a man of skill ;

If he does you no harm, he does you no ill.”

The stethoscope, therefore, passed into use and into fame with imperceptible step and unmistakable certainty, until at last it literally blazed forth in full splendour. What effect it produced when it did take, let Forbes, who was an eye-witness, relate in his own language.

“ His work ” (the original work of Laennec) “ *De l'Auscultation Mediate ; ou, Traité du Diagnostic des Maladies des Poumons et du Cœur, fondé principalement sur ce nouveau moyen d'exploration*, was at first received by the profession with considerable distrust ; and the new mode of diagnosis, and especially the instrument, was attempted to be turned into ridicule. Indeed, but for the admirable descriptions of the diseases contained in the work, which proved the vast industry and talent of the author, and rendered his volumes infinitely valuable, whether his diagnosis were true or false, it seems probable that the discovery of Laennec, like that of Avenbrugger, might have been allowed to fall into temporary oblivion. As it was, however, the work soon excited a great sensation in Paris ; and the new method of diagnosis was hailed, especially by the younger members of the profession, as a discovery fraught with the most splendid results. Fortunately the whole of the author's investigation had taken place in the eye of the public, and before numerous and zealous pupils, both able and willing to prosecute the methods which they had seen productive of such wonderful effects in the hands of the Master. These pupils, with a fervour natural to their years, soon spread the practice of

auscultation not only in France, but conveyed it, in some degree, into every country of Europe."

The labour of this overwhelming effort told severely on the health of its author, and indeed for a season laid him so low that it was necessary for him to retire from Paris, in the very midst of his triumph, and seek repose in the district where he was born.

Near to Quimper, on the bay of Douarnenez, he had a country house, which was known by the name of Kerlouaruco, a provincial term meaning a place of foxes, and it was here that he sought the repose which he had so richly earned. He was, in point of fact, extremely ill. In a communication made to Dr. Forbes, Dr. Meriadec Laennec stated that the symptoms were dyspnœa, with puerile respiration, without cough; dyspepsia and anorexia, but without redness of tongue; nausea, vomiting, diarrhœa, and pain in the abdomen; a tendency to vertigo, but without headache; great muscular debility, with disposition to fainting; and lowness of spirits, amounting almost to *tedium vitæ*; the two last-named symptoms being the most distressing of all.

The effect of the native air, the change of scene, and the outdoor sport, including hunting, to which he was much devoted, had an influence for good on Laennec which was magical in its results. He soon regained his good spirits, he regained flesh, and the chest symptoms quickly abated. The improvement was so great that he hesitated whether he ought ever to return to Paris, and his inclination was entirely against such return. But a sense of duty, amounting to obligation, caused him to run every risk and go back to his post. He feared he might not survive even so long as six months, yet still he must resume his labour in the

completion of his work and to the best of his ability leave it perfect for the future. This was but fair to the profession and to humanity. He returned to Paris and to his professional labour on November 15th in the year 1821.

Laennec was at the time named forty years of age, and his duties were resumed with all the ardour of his willing nature. They were not curtailed by his enforced absence from them; on the contrary, they increased as his fame had done, and as the new practice which he had instituted bore the test of experience from others as well as himself. Many pupils were waiting to receive his instructions in the art of diagnosis by mediate auscultation; and soon a clinical class, which he was obliged to form, was crowded with students from all parts of Europe. His great book on the subject of his clinical teaching had also to be extended, and the little instrument the stethoscope had to be modified in various ways before it met with its final shape according to his full approbation.

It may be worth the rest of a moment in this place to refer to the development of the stethoscope. We have seen already that the first instrument was improvised from a roll of paper, which for a short period answered fairly; but soon a more durable instrument was turned in wood in the form of a straight cylinder one inch and a third of an inch in diameter, and twelve inches long, with a bore of the third of an inch extending quite through it. The tube was divided into two parts in the centre, transversely, so that it could be taken into two pieces if necessary, and at its lower part—that which was applied to the chest—it was armed with what was called a stopper, which could be taken out or fixed in by means of a short connecting bit of brass tube.

Forbes had in his possession one of these "second edition stethoscopes," that had been sent to him by Laennec himself a short time before his death, an instrument which I remember seeing at Forbes' house when once visiting him there, in company with the late Dr. Patrick Stewart and Sir John Rose Cormack. Forbes used this stethoscope for many years in preference to any other, although towards the end of his active life he retained it rather as a curious relic than as an instrument for daily practice.

The stethoscope in a more advanced stage assumed a more finished, or third, development; and this was the instrument that first found its way into England. It was imported from Paris in 1820 by Trentell & Wurtz, booksellers, in Soho Square, at the price of two francs; and when the demand for it exceeded the supply from abroad, it was manufactured by a wood-turner named Allnutt, who lived in Piccadilly. One of the stethoscopes made at this stage—or rather part of one, for a section of it is lost—was given to me by Dr. Willis, of Barnes, in exchange for another with a jointed ear-piece, which I had invented, for the convenience of the pocket, and which he very much liked. I have this third edition instrument still in my possession, have had it in daily service for about thirty-eight years, and a better instrument I could never wish to use. It is seven inches and a half long, has a half-inch bore, a bell-shaped mouth a little more than an inch in diameter, and is surmounted by an ivory ear-piece two inches and a quarter in diameter.

To return to Laennec. On recommencing practice he was appointed by Dr. Hallé, physician to the Duchesse de Berri, as his successor in that very responsible and not very lucrative post, for which he received four

thousand francs per annum; and on July 31st, 1822, he succeeded Hallé in another and much more dignified position, as Professor in the chair of medicine in the College of France. He commenced his professorial duties on the second of December of the same year.

Some political disturbances which arose in the Faculty of Medicine caused that department to be closed by royal decree for some months; and when it was reopened in February, 1823, Laennec was elected to fill the chair of clinical medicine at La Charité. He had been offered to be made a member of the Royal Council of Public Instruction, but he preferred to continue at his clinical labours, by which he was still to advance the new art of diagnosis he had founded, and to revise the book that was to carry his name down to posterity.

THE VICTIM OF LABOUR.

Busily engaged in his many and distinguished pursuits; acting as the consultant in a practice which rapidly increased, although cut down by careful selection to the lowest possible working form; teaching several hours each day his new methods of diagnosis, and in the act and art of teaching learning also and correcting past mistakes or misunderstandings of nature; revising and republishing a fresh edition of the work on auscultation, with additions on the subject of treatment; the feeble body of Laennec again proved incompetent to bear the mental strain to which it was subjected. The book was finished, and so was its author, in as far as active labour of mind was concerned. A dry, hard cough, which came on insidiously, increased, and in the course of the year 1826 grew so serious as to

compel a return to Brittany and native air. As early as April the disease was making rapid progress. He was subject to febrile paroxysms and loss of flesh ; and, in addition, he had pain in the right side and diarrhœa. In accordance with the prevailing practice of the time, he was bled, and otherwise treated as one who required strict antiphlogistic measures. Of course this treatment was of no avail, and, not to be too severe upon it, had better have been omitted ; for, in plain matter of fact, the man was now fatally stricken with the very malady—*Phthisis pulmonalis*—which he, by his own consummate skill, had done so much to elucidate.

As the last resource Laennec must resignedly lay all his honours and useful labours by, and go home in every sense of that expressive term. Unfortunately on his journey to Quimper he was unduly delayed, and in the course of the journey met with an accident which shook him considerably and aggravated his malady. For a little while, nevertheless, he was revived by the change ; and, by the bright sea air with its friendly surroundings, was made comparatively happy, if not hopeful or ambitious of life. The relief was merely temporary ; his symptoms became daily more and more severe, and on August 13th, 1826, in the forty-fifth year of his age, he breathed his last breath, and was buried in his native place.

He died childless, although two years before his death he had married. His widow, Madame Laennec, received from the State a pension of three thousand francs per annum. She lived until the year 1838.

Forbes, whose excellent memoir is the oldest after that of Bayle, and perhaps the best that has been written on Laennec, is careful to relate that the cause of the death of the discoverer of the stethoscope

was consumption of the lungs; and he adds that it is somewhat curious that he shared the fate of some of his most illustrious predecessors in falling a victim to a disease the nature of which he had taken particular pains to describe. "Lancisi and Corvisart died of diseased heart; and his own friend Bayle sank, like himself, under the ravages of the disease of which he had been the most successful illustrator. M. Laennec's case presented all the external symptoms of consumption; and its nature was, moreover, fully confirmed by the very art which he had himself discovered. Before he left Paris Doctors Recamier and Meriadec Laennec discovered imperfect but evident pectoriloquism under the clavicle and in the supra-spinal fossa of the left side; and, at Quimper, Doctors Ambrose Laennec and Olivry observed the same in the infra-spinal fossa. Some time before his death his medical attendants had likewise discovered a hard, irregular tumour in the abdomen, the precise nature of which was never ascertained, as the body, owing to the absence of any competent operator, was not subjected to examination after death.

THE MAN PERSONALLY.

The personal character of the discoverer of the stethoscope, as described by the best authorities and from his immediate contemporaries, is singularly impressive and beautiful. "He was of diminutive size from birth, but not a sufferer from disease in the earlier parts of his life. He grew up small in stature and very thin, but of greater muscular powers than his figure promised." He was extremely fond of field sports, and took great delight in speaking of them. The exertions he was capable of making on these

occasions were remarkable, considering, as he said, "*l'air chetif de son exterieur.*" For instance, he could walk eight or ten leagues, carrying his bag and gun, and on his return home, in place of resting himself, could enter into some species of domestic amusement. "During the latter part of his life he was attenuated in the most remarkable degree, insomuch that it was a matter of astonishment to every stranger that he could undergo the exertions which his duties required. He was a man of the greatest probity, and habitually observant of his religious and social duties. He was a sincere Christian and a good Catholic, adhering to his religion and his Church through good and bad report. His death, according to Bayle, was that of a Christian. Supported by the hope of a better life, prepared by the constant practice of virtue, he saw his end approach with composure and resignation. His religious principles, imbibed with his earliest knowledge, were strengthened by the conviction of his maturer reason. He took no pains to conceal them when they were disadvantageous to his worldly interests; and he made no boast of them when their avowal might have been a title to favour and advancement. He was mild and agreeable in his manners, and of a quiet and even temper. His conversation was at once lively and instructive, and his natural humility and kindness of heart were in no degree lessened by his great reputation and the deference that was paid to him in the latter part of his life. He was remarkable for his great kindness and courtesy to foreigners, particularly the English. He was, however, less popular with many of his own countrymen, and especially with that numerous class of students and young practitioners who were disciples of

the school of Broussais. With Broussais Laennec was much at variance, and a controversy was kept up for some time between them which redounded little to the credit of either. For Laennec was not free from prejudices, and he could never be brought to render full justice to the doctrine of his opponent."

Such is the testimony borne by the contemporaries of Laennec to his memory, to his virtues, to his failings. It must be admitted that his virtues far outbalance his failings, and it may not unjustly be said of his failings themselves that they leaned to virtue's side. His worst fault of all seems to be that he opposed the school of Broussais ; and now that the excitement and enthusiasm which surrounded that school have passed away, now that the glamour has faded, and we are able to look on the hypothetical follies of that school calmly, we may forgive Laennec a great deal, perhaps, willingly, all. He saw the follies ; we have only read of them, a marked difference. More than that, he had anticipated some things that were really good in the system ; and in regard to what he thought the best, as founded on direct observation from nature, he was not recognized. But the most cogent cause of dispute lay in the primary difference of nature of the two men themselves. Laennec was a simple observer, sensibly acute in respect to all that came before him, diligent in recording, and industriously slow in collating that which he had recorded. He had never occasion to go seriously back in his record ; and yet, with true and simple honesty, he was ready at every moment to revise whatever appeared to him to demand revision. Broussais, on the other hand, was of imaginative disposition ; fretful under labour, while yet a severe labourer ; hopeful beyond the natural confines of hope, and angry if, at any time, a

cherished doctrine or expectation did not respond to the desire which was its true and devoted parent.

In a great many points of view Laennec resembles closely our own Harvey. He must have been something like Harvey in figure; but he was more like him in mind. Both were devoted to classical learning; both were accumulators of rich stores of original facts from nature; both left behind them incomplete treasures of industry. But the point of resemblance that is most striking, and, indeed, too striking to be passed by, is the similarity of power of observation with which they seized hold of what to others were mere trivial incidents, and turned the same into instant practical account on matters previously slumbering, and which, once awakened, gave a new voice and character to the whole of the future of science. How truly trifling a circumstance may be the vital circumstance which such men disclose, from what, to men unendowed with the finer faculty, are mere passing incidents! If Harvey had never been shown the valves in the veins, how long might not the circulation of the blood have remained concealed! If no patient had appeared before Laennec to whose chest he could not put his ear, nay if the roll of paper of which he speaks had not been at hand, how long, even with Laennec in the flesh, might the stethoscope have been kept from the light, and the physical diagnosis of disease of the chest been an unknown art! The art began with Hippocrates, and slumbered for ages. What millions of physicians must have attended millions upon millions of cases of chest disease between Hippocrates and Laennec; physicians learned as Galen, wise as Sydenham, keen as Morgagni! And yet Laennec was the man and mind wanted to make, or rather complete, a discovery that had been lying ready for

birth some thousands of years; and he, for that birth, required a patient of a special kind, and a quire of paper conveniently at hand to roll into a tube. Dr. Walsh, in one of his admirable volumes, reminds us on the title-page, of an old scholar who went so far as to predict that a day would come when men would listen to the workings of the animal mechanism as they, in that time, listened to the work that was going on in a carpenter's shop, and in due course the time did arrive. It arrived at last, but not in a hurry, even under the lift it got from the very suggestive prediction. It waited for the fat young lady with heart disease whose chest could not be touched by ears polite, for the quire of paper that admitted of being rolled into a tube for listening through, and for this man Laennec to do the part of thoracic eavesdropper. Then all was clear as day, and people began to go to the doctor to be "sounded," just as naturally as they went before to have their pulses felt, or their tongues looked at, or their blood drawn.

It was a common saying regarding Laennec, by his compeers, that, while he was without a rival in diagnosis, he was not a good practitioner, which means that he was not a good practitioner according to their ideas of practice heroic and fearful. To us Laennec would now be a practitioner very heroic, so much so, that I doubt if any medical man living would, for the life of him, take some of his prescriptions; but in his own time, when so little was known of the great system of natural cure, he would easily be out of court. It was amply sufficient against him that he had a glimmering of the truth as to the existence of a considerable run of cases of organic disease for which the so-called practice of remedial cure, by drugs, blood-lettings, and other heroic plans could do no good, but was likely to do grievous harm,

harm as good, to say the least on so debatable a point.

LAENNEC IN LITERATURE.

We have seen Laennec as scholar, physician, and discoverer. We have yet to glance at him as a man of letters. From the earliest days of his practice he cultivated literature. He had real love for learning, and so classical were his tastes that he was accustomed to carry out his correspondence in the Latin tongue. Forbes gives two letters written in Latin which he received from this master, who was wont to regret his inability to enforce his views that the Latin should be the one common language in daily use amongst the scientific and learned of every country.

At the early age of twenty-one he was an author, his first essay having for its subject a case of disease of the heart. A little later he published another essay on *Inflammation of the Peritoneum*, which, as a pathological study, was shrewdly in anticipation of the later works of one who became his most formidable rival, the famous Broussais. He wrote also a review of the French edition of the great work of Benjamin Bell on the venereal disease.

His early additions to medical literature were communicated to the "*Journal de Medicine*" while it was under the editorship of Corvisart, Leroux, and Boyer, and in 1804 he was himself appointed editor of this journal, a post which he held for six years with credit to himself and advantage to the profession. Amongst other essays in his early days which attracted the notice and admiration of his seniors was his graduation thesis on the doctrine of Hippocrates applied to practical medicine. Bayle was much impressed by the know-

ledge which the new graduate displayed of the ancient Greek science of medicine. The criticism was sound, for with the works of the father of the healing art Laennec was so familiar that, as he himself admitted, he derived the discovery of mediate auscultation from them.

In 1827 F. G. Boisseau enumerated the minor works of Laennec in the following order :—

“ *A Treatise on Peritonitis, in the Journal of Medicine of MM. Corvisart, Leroux, and Boyer, 1802-3.*

“ *A Treatise containing the Description of the Membrane Proper of the Liver. Ibid., 1803-4.*

“ *Description of an Anatomical Process by the aid of which the Internal Membrane of the Ventricles of the Brain can be Dissected, of which the Anatomists admitted the Existence by Analogy, but without having demonstrated it with the Scalpel. Ibid., 1804.*

“ *A Treatise on Pathological Anatomy. Ibid., 1804.*

“ *Monograph on Vesicular Worms, containing the Description of several New Species, and of the Diseases and Organic Changes to which the Presence of these Worms gives rise in the Human Body. Paris, 1805.*

“ *A Treatise on the Melanoses, a Kind of Accidental Productions, Confounded until then with Cancers. Bulletin of the Society of the Faculty of Medicine, 1806.*

“ *Essay on Angina of the Chest, 1806.* Essay to prove, by observations and anatomical researches, that the affection described under this name by several Scotch and Genevese physicians cannot be attributed, as several amongst them had thought, to the ossification of the coronary arteries of the heart, and that it often exists without any organic change.

“ *A Treatise on a New Species of Hernia. In the Archives of the Royal Academy of Medicine, this*

treatise was printed on account of the translation by M. Cayot of the Treatise on Hernia, by M. Scarpa.

"In the Dictionary of the Medical Sciences there are also some papers by Laennec on *Pathological Anatomy, Hydatids, and Encephaloides*."

In addition to the works above cited by one of his cotemporaries, Laennec contributed essays on *Suicide*, on *Disease of the Heart*, and on *Hydrocephalus*, in the *Journal of Medicine*, as well as an article on the *Brunonian System of Medicine* and on the *Works and Doctrines of Gall*. Concerning the ideas of Brown—which were commented on at length in a late ASCLEPIAD—Laennec entertained the most just views. He considered the remarkable Scotchman to have been a man of true genius, who, if he had interrogated Nature instead of commenting on her ways without investigation, would have discovered many of her secrets and added largely to the solid learning of medical art. Of Gall's system he was less appreciative and more critical, telling a capital story of the first Vestris, the dancer, who on being asked, after one of his dancing feats, if he were not tired, replied, "Monsieur, dans notre art la fatigue des jambes est peu de chose ; c'est ceci qui travaille," pointing to his head. "Why, then, does not Gall," asks Laennec, "give a bump for dancing as he does for painting?"

After all, the grand reputation of Laennec must rest on his one immortal work, and on his own special discoveries. It is not too much to say that any man of good intelligence could have written the other memoirs. No one less than a Laennec could have written the treatise on *Mediate Auscultation* and the *Use of the Stethoscope*. The true student of medicine, who never wears out, reads this original work of Laennec once in two years,

at least so long as he is engaged in practice, and takes a living interest in the subject of which it treats. He keeps up in this manner a knowledge of principles and foundations. He continues to remember the origins of terms and names. He lives with origins, with original thoughts and events, by which his own original powers of observation are nourished, directed, and sustained. Sometimes he meets with natural mistakes, as where the great discoverer thinks and teaches that the first sound of the heart is caused by the contraction of the ventricles of the heart, and the second sound by the contraction of the auricles. Yet, every such fault admitted, the work as a marvel of genius, research, and industry is one of the few best of best, of which ten at most make up the whole. It ranks equally with the original works of Vesalius, Harvey, and Bichat, and, as a section of medical literature, is quite equal to any section of Hippocrates. It is a book of pathology as well as of diagnosis; and if the matter of treatment be its weakest part, even that was far in advance of its time.

Medical France may well be proud of Laennec, and we English, of whom he was so fond, ought to share in the exultation. I fear, however, that Frenchmen themselves are not sufficiently alive to the immortal deserts of this one of their immortal countrymen. In Paris, I have often asked intelligent Frenchmen:—Where is the grand monument to Laennec, where the grand boulevard that is honoured by his illustrious name? And the only answer I have ever received has been that shrug of the shoulders with which the dearest fellows of France always tell us Islanders: “*Je ne sais pas.*” Were I a rich Frenchman, or even a rich Englishman, they should soon know all about it!

SOME ORIGINAL OBSERVATIONS IN PHYSIOLOGICAL THERAPEUTICS MADE ON THE FRESH-WATER JELLY-FISH, OR MÈDUSA. —LIMNOCODIUM SOWERBII.

IN the year 1880, on June 12th, Mr. Sowerby, of the Royal Botanic Gardens, discovered in the warm water of the tank in which the *Victoria Regia* and other tropical aquatics are cultivated, the aquatic animals now known as the fresh-water medusæ, or jelly-fish. On the first day in which they were seen very few were present, but on the following day they were in much greater numbers. The little animals were such entire strangers, their presence was not merely new to the gardens of the Royal Botanic Society, but to the whole garden of natural history which man has up to that time interrogated scientifically. Living specimens were, thereupon, distributed to Professors Flower, Mivart, Ray Lankester, Allman, Busk, and Mr. Romanes, for their observation; and they all reported that they had never before heard of any species of medusa inhabiting fresh water. To the animal thus discovered the generic name *Limnoco-dium*—*λιμνη*, a pond, and *κωδων*, a bell: Pond-bell—was given by Professor Allman, to which Professor Ray Lankester very properly added *Sowerbii* as the name of the species, after the discoverer.

From the period named these medusæ have re-appeared each year for a short time during the warm weather. Where they came from or when they first appeared is altogether unknown. It is not known that any plant has ever been introduced into the tank by which the animal could have been carried from a tropical region.

PHYSICAL CHARACTERISTICS OF THE FRESH-WATER MEDUSÆ.

Mr. Sowerby in the original account which he gave of these animals says that "the generic name *Limnocodium*—Pond-bell—very happily describes the general form of the animal, 'which much resembles a small, shallow, nearly hemispherical bell, of the most delicate structure, transparent almost as glass, the tentacles of a beautiful opalescent white, and, as seen floating in the water, resembling the ordinary marine jelly-fish, but from which, however, it differs in many particulars, one of the peculiar features being that the tentacles are extended upwards when the animal is floating, instead of hanging from the bell, as in most other members of the group. The size varies much according to age. Individuals have been noticed as small as pins' heads, one-thirtieth of an inch, and from this the size ranges up to one-third of an inch, or of full-grown adult specimens, fully expanded, to half an inch in diameter; the bell, or umbrella, is quite transparent. The marginal ring bears three sets of tentacles: the first, a set of four large, primary tentacles; second, a tier of twenty-eight, or more, secondary, medium size; and third, a tier of one hundred and ninety, or more, small, tertiary tentacles, placed in groups of six between the secondary ones. The stomach is long and tubular, extending below the disc, and may be likened to the stick of an umbrella.'"

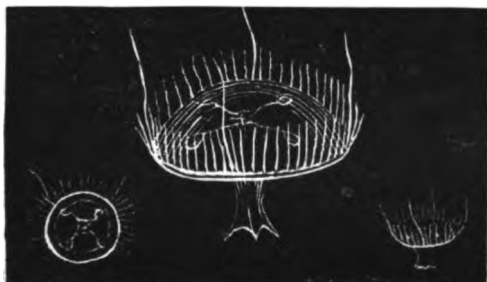
"The mode of progression through the water is by the sudden contraction of the marginal ring, exactly like the rapid closing and opening of an umbrella or parasol, and the individual appears capable of directing its movements in whatever direction it pleases; its activity, at least when in good health, is stimulated by the temperature of the water in which it is placed. Mr. Romanes, after many experiments, found that at the temperature of 85° Fahr. (the temperature of the water in the Victoria Tank) the pulsations reach as high as 180 per minute, but when the temperature is reduced to 65° Fahr. the maximum rate falls to 80 per minute. He also remarks, that although a temperature of 70° Fahr. is fatal to all the marine species, it is only a temperature of 100° Fahr. that is fatal to this fresh-water species; and again, that although the marine species will bear to be frozen solid, this fresh-water variety is completely destroyed by freezing. He also found it to be much less able to stand a transfer from fresh to salt water; an exposure of say five minutes of the marine species in fresh water generally ends fatally, but a like transfer of the new animal to sea-water for only one minute produces the same result: and in so small a percentage of salt as one of sea-water to ten of fresh, it gradually becomes feeble and dies, and thus Mr. Romanes concludes that, presuming this fresh-water species to be a modification of the marine type, 'it would be hard to point to a more remarkable case of profound physiological modification in adaptation to changed conditions of life than the present example of an animal so exceedingly intolerant of fresh water as a marine jelly-fish, that may have had all its tissues changed so as to adapt them to thrive in fresh water, and even die after an exposure of one minute to its ancestral element.'

“Although it is to be presumed that the new medusa, from its having been found only in the warm water, is a native of the tropics, we have as yet been unable to determine how or from whence it came into our tank. At first it was suggested that it arrived from the Amazon river on the roots of the Victoria Regia, but as this plant is an annual, and every year a new individual plant is raised from seed of our own saving, this supposition is untenable. The only water-plant we have received within the last year or so from abroad is the newly introduced *Pontederia azurea*, which came to the Gardens indirectly from Brazil, in March, 1879, and the tank is cleaned out every winter, and remains during some months empty and dry. Many water-plants have been added to the collection from correspondents at home, but we have not heard of the new jelly-fish having yet been observed in any other tank in the United Kingdom. As before mentioned, they were first seen on June 9th, 1880, and rapidly increased in numbers during about fourteen days, when they became less numerous, the last one being seen on June 28th. A few were preserved in a glass jar in the office; these remained very active for several weeks, but the last died on August 5th; a few again appeared in the tank on August 28th.

“It was exceedingly interesting to watch their habits, swimming and floating about at will in all directions, their activity being stimulated by the warmth of the water, so that, by counting the pulsations, the temperature of the water might be ascertained; in fact, our little strangers may be likened to natural thermometers. Their food, no doubt, is furnished by any living animal organisms that happen to come within their power and the reach of their arms; they were

seen picking out from the toils of the labyrinth of their tentacles living *Daphne* (water-fleas) and other tit-bits, using the tip of their long, trunk-like stomach (manubrium) exactly as the elephant employs his trunk, in fact, manipulating as with the hand, seeking, approaching, and comforting any part of the body touched or irritated. This extreme sensibility, and the retractile power of the tentacles, and lively movements of all parts of the individual, imparted an appearance of intelligence seldom noticed in the so-called lower animals." *

In illustration of the above descriptions, Mr. Sowerby has been good enough to supply me with the drawing of a medusa, here subjoined.



Professor Allman followed Mr. Sowerby in observing these medusæ. In a paper read to the Linnæan Society, on June 17th, 1880, he describes them as follows :—

“They are very energetic in their movements, swimming with the characteristic systole and diastole of their umbrella. The *umbrella* varies much in form with its state of contraction, passing from a somewhat conical shape with a depressed summit, through figures

* *Quarterly Record Royal Botanic Society*, July to September, 1880.

more or less hemispherical, to that of a shallow cup, or even of a nearly flat disc. Its outer surface is covered by an epithelium of flattened hexagonal cells, with distinct and brilliant nucleus. The *manubrium* is large; it commences with a quadrate base, and, when extended, projects beyond the margin of the umbrella. The mouth is destitute of tentacles, but is divided into four lips, which are everted and plicated. The *radial canals* are four in number; they originate each in an angle of the quadrate base of the manubrium, and open distally into a wide, circular canal. Each radial canal is accompanied by *longitudinal muscular fibres*, which spread out on each side at the junction of the radial with the circular canal. The *velum* is of moderate width, and the extreme margin of the umbrella is thickened and festooned, and loaded with brownish-yellow pigment-cells. The attachment of the *tentacles* is peculiar. Instead of being free continuations of the umbrella margins, they are given off from the outer surface of the umbrella at points a little above the margin. The *lithocysts*, or *marginal vesicles*, are in adult specimens about one hundred and twenty-eight in number. They are situated near the umbrellar margin of the velum, between the bases of the tentacles, and are grouped somewhat irregularly, so that their number has no close relation with that of the tentacles.

The *marginal nerve ring* can be traced running round the whole margin of the umbrella, and in close relation with otolithic cells. Ocelli are not present. The *generative sacs* are borne on the radiating canals into which they open at a short distance beyond the exit of those from the base of the manubrium. They are of an oval form, and from their point of attachment to the

radial canal hang down free into the cavity of the umbrella. Some of the specimens examined contained nearly mature ova, which under compression were forced from the sac through the radial canal into the cavity of the stomach." *

In addition to these histories by Mr. Sowerby, Professor Allman, and Mr. Romanes, Professor Ray Lankester has contributed some most valuable information on the medusæ, and has entered into many minute details of extreme interest. He says that the *Limnocoodium* digests its solid food by the inception of the solid food particles into the substance of endodermal cells, each endodermal cell behaving as an amœba. He has shown the presence of such food bodies as protococci, diatoms, and euglenæ in various stages of digestion *within* the protoplasm of single cells, and of aggregated groups of such cells. They were observed with a magnifying power of eight hundred diameters. This learned observer also remarks that not the least astonishing fact about the new fresh-water medusæ is the immense preponderance of males. Amongst more than fifty specimens which he examined he did not find one female, yet female or egg-bearing forms are there. He has also given a careful account of the young animals hatched in the jar.†

I have thought it necessary to give this history of the fresh-water medusa from the best sources of information, firstly, because I feel sure it will, on its own account, be acceptable to my readers; and, secondly,

* *Nature*, xxi. (1880), p. 178.

† *Quarterly Journal of Microscopical Science*, pp. 851—871. Published by J. & A. Churchill, July 1880.

because it is a proper prelude to outlines of the brief research bearing on physiological therapeutics which I am about to relate.

PHYSICAL AND THERAPEUTICAL OBSERVATIONS.

Whilst watching the fresh-water medusæ in full vigour of life in June last, the thought struck me that in the minute muscular movements impelled by nervous stimulus derived from the nervous circle or ring which they possess I was watching nervous and muscular action identical with that which in the human subject may be said to be independent of brain or spinal cord ; that motion of the involuntary muscles which is called forth by the organic chain of nerves. This movement, influenced obviously by light, is like the movement of the pupil of the eye. The motions are excited by light, are quickened by warmth ; and, as it seems to me, they are quickened by some sounds. Here, therefore, we might have a field for direct observation of the action of some gases, vapours, fluids, and other substances used in medicine, which when administered to man produce their effects by the influence they exert on involuntary fibre through the organic nervous mechanism.

In order to ascertain if there were any truth in this thought, I asked Mr. Sowerby to supply me with a few specimens of medusæ from the tank in the water-lily house, and, by carefully keeping them in favourable conditions, I was able for a short time to test on them the action of a few of the most active medicinal agents which we are accustomed to employ in practice. As a natural and, I feel sure, a correct course, I employed, having a very brief season for work at command, those substances which were most familiar to me in research.

Method of Research.

The method pursued was as follows :—

The water of the tank was employed, this water having been observed by Mr. Sowerby to be that in which the animals lived most vigorously.

During observation the water was maintained at 80° Fahr. A glass vessel was fitted up for observation, in a good light, in which a column of 1,000 grains of water was placed.

Into this thousand grains of water there was diffused, as a first experiment in each series, one grain of the substance the action of which was about to be observed. This was called the *test-water*.

Another similar tube was set up, into which the same quantity of water was placed without receiving any foreign substance—simple tank-water. This was called the *neutral water*.

When all was complete for observation one of the medusæ was taken from the large jar containing the store of them, and was placed in the tube containing the tank-water simply. Then another of the medusæ was put into the water containing the foreign substance to be tested, and the time of the immersion was accurately noted.

The conditions of the two medusæ, one in test, the other in neutral, water, were now observed closely, and the new phenomena were recorded.

ACTION OF CHLOROFORM ON MEDUSÆ.

The first observations were made with chloroform. Into the thousand grains of water containing one grain of chloroform,—the water being at 80° Fahr.,—a medusa was placed by the side of another that was in the tube containing tank-water only, also at 80° Fahr.

Results.

Within a minute the medusa in the chloroform was distinctly affected. The movements of the animal, which had been previously at the rate of 84 in the minute, rose to 120. In the next succeeding minute a series of rapid and irregular movements occurred, precisely similar to the convulsive or tetanic movements common to the second stage or degree of chloroform anæsthesia in the human subject; in the space of thirty seconds more, this movement lapsed into absolute quiescence, during which the animal slowly settled down and collapsed to the bottom of the tube. The transparency of the body was changed into opacity, the tentacles were drawn closely together, and the whole structure assumed the appearance of that rigidity which denotes the solid or pectous condition of colloidal matter.

Water at 80° will take up one part of chloroform in every 250 parts of its own substance. The chloroform, consequently, was in complete solution; and the water, which tasted distinctly of chloroform, was of fatal strength, and sufficiently charged to cause coagulation of the fluids of the animal structure, the most determinate of all causes of death. In plain terms, the chloroform produced the phenomenon of rigor mortis, as it is called in the higher classes of animals.

The most interesting part of the phenomena was that the stages of action were the same as those which are seen in the human subject under chloroform; namely, a preliminary stage of excitement, followed by a convulsive stage, by a succeeding stage of collapse and insensibility, and by a final stage of death. The inference to be drawn from this is that the action

of chloroform on the higher animals and on man is not, in the first stage of action, directly and immediately on the brain and higher centres, but upon the nervous system of organic life.

In a second, and in several succeeding observations, I tested the action of chloroform in smaller proportions, reducing the proportion to 1 part in 4,000. The phenomena were the same, except that the coagulation of the tissues was less distinctively marked and the time of the stages was prolonged. In no case was there any recovery after the tetanic stage had been developed. I thought that by taking the animals out of the water and placing them in tank-water simply they might recover, but this was never the case.

I may notice that the same results were observed from the action of the series of bodies allied to chloroform, namely, methylene bichloride and carbon tetrachloride, with this simple difference: that the effect was more rapid with the lighter bichloride, and slower with the heavier tetrachloride than it was with chloroform. In short, all these chlorides exerted the same action, with the exception of the differences arising from their physical conditions as modified substances of the same family.

ACTION OF ALCOHOL ON MEDUSÆ.

The inquiry was next carried out in regard to the action of alcohol on the medusæ. The same rules precisely were followed. The tube holding 1,000 grains of tank-water at 80° Fahr. was charged with 1 grain of absolute ethylic alcohol. When the diffusion of the alcohol through the water was complete, a medusa was placed in it and observed side by side with another medusa in the neutral tube. The action of the alcohol was very rapid and very decisive. Within two minutes

the movements of the animal, which were counted at 74 in the minute, were entirely stopped, and it was beginning to sink to the bottom of the jar much shrunken in form. At the end of five minutes it lay at the bottom of the tube a mere pearly speck of matter, while its fellow in the neutral tube was moving about quite unaffected. Removed carefully from the alcoholized water, the shrunken medusa looked like a little pearl with light fluffy tentacles expanding from it. It was put into plain tank-water warmed to 80° Fahr., and was left there for twenty-four hours; but it showed no sign whatever of resuscitation.

Another alcoholic solution was made, in which the proportion was 1 grain of alcohol to 2,000 of water. Into this solution another active medusa was placed. It remained for four minutes swimming about lustily, and but little affected. It then began to move with less freedom, and at the end of another minute sank to the floor of the jar shrunken and motionless. It was taken out at once and placed in fresh water, or rather tank-water, at the same temperature (80° Fahr.), but it showed no sign of recovery, and shrank, like the former, into a pearly mass with soft, fluffy margins.

A third solution was made, in which the alcohol was in the proportion of 1 part in 4,000 of tank-water. A medusa was put into this solution, with the same precautions as in the preceding cases. In five minutes the motion commenced to cease, and the animal sank into the lower part of the tube, where it collapsed, lost its transparency, and assumed more slowly, but quite as decidedly, the pearly semi-solid state.

A fourth observation with alcohol was conducted as follows. A solution of alcohol was formed in the proportion of 1 part of alcohol in 10,000 parts of the tank-

water, at 80° Fahr. Into this solution a medusa was put, in the same way precisely as in the other experiments. The animal was watched for an hour, but without the indication of the slightest change in its motion or condition. To the water a fresh charge of alcohol was now added, so as to ensure a proportion of one part in 5,000 of water. Again there was no appreciable effect. At the close of two hours more the alcohol was increased to the proportion of one part to 2,000 of water. To my surprise, the animal remained still unaffected, although the same solution was fatal to other specimens plunged directly into it. After a lapse of over three hours more the strength of the solution was increased to one part in the 1,000. Again for a long time there was no effect; but in the course of an hour the movements became slower, they also gradually grew weaker, and by the end of four hours they ceased altogether, the structures undergoing precisely the same fatal change as in the others which had died rapidly in the same strength of solution.

These observations on the influence of alcohol show very decisive results. They indicate that alcohol destroys the motion and life of the medusa by the process of coagulating the colloidal tissues of the animal. Excessively soluble in water, the alcohol would diffuse through the watery animal tissues just as readily as it would through water itself, and it would seem that in the proportion of one part in the 1,000 coagulation is the certain effect. But here comes the curious fact that if the strength of the solution be gradually increased from a quantity that is not poisonous, a tolerance is set up which is a source of temporary safety at least. Whether this tolerance is due to an action on the nervous matter or to some change of

action on the colloidal material, by which the process of coagulation is rendered slower, it is not easy to say. I infer, however, that the latter view is most likely to be the correct one, since the fact observed tallies with those which I and others have recorded on the coagulation of the blood; namely, that some solutions of one substance which will produce instant coagulation will, in reduced strengths, retard or even prevent the process of coagulation.

I have no doubt that alcohol stops the vital movements of the medusæ by its action on the colloidal matter of which their delicate organism is composed. That it sometimes acts on man in a similar manner, leading to change of structure in the delicate membranous expanses, is a view which, as is well known, I have long ago expressed, and which this research singularly and unexpectedly confirms.

ACTION OF ANHYDROUS ETHER ON MEDUSÆ.

In a third series of researches I used pure anhydrous ether as the substance the action of which was to be tested on the medusæ. In the same way as before the tube of 1,000 grains of water was prepared, and the water was treated with one grain of the ether at 80° Fahr. A medusa put into this solution underwent no change whatever, a result I was not unprepared for, the ether at the temperature named being rapidly lost by evaporation. After waiting an hour I commenced adding more ether, until I had quite saturated the water, ten parts of which were capable of taking up one part of ether. In this solution no effect whatever was produced. I put several medusæ into the solution, but observed no change in their movements. I added more ether until a layer of it two lines thick floated upon

the surface of the water, but still the medusæ continued to move briskly beneath. In swimming upwards one of the animals rose actually into the ether itself, it instantly fell with its umbrella quite flattened out, and so, gradually and without muscular motion, glided, in a slanting position, to the floor of the vessel. It lay there, apparently dead, for six hours, and then began to revive, until it made a perfect recovery. Another medusa which had risen nearly to the surface of the ether, but not near enough to touch it, underwent no change whatever. A medusa taken out of the store jar was dropped into the jar through the ether. By contact with the ether it was rendered insensible, and glided to the bottom of the jar; but in time it also recovered and became as active in the water charged with ether as in the tank-water, although the water was strongly impregnated with the ethereal flavour and odour. Several other medusæ were kept in an ethereal solution in a larger jar for many days, and were finally transferred to simple tank-water in better condition than some that had been all the time in tank-water.

ACTION OF AMYL NITRITE ON MEDUSÆ.

The action of amyl nitrite was followed out, after the manner described above in relation to the other substances tested. One part of pure nitrite was dissolved in 1,000 parts of water at 80° Fahr. Into this test solution, which tasted distinctly of the nitrite, a medusa was introduced in the usual glass vessel. For three minutes the animal floated quite freely, moving seventy-three times a minute, and in regular order of movement. It then suddenly spread out flat, and turning almost inside out, sank rapidly to the bottom of the vessel, where it remained motionless.

By closing the glass vessel at the top and turning it gently up and down the animal floated about with the movement of the water, but no motion of its own could be noticed, although it was examined many times with a strong eye-glass. At the same time, its tissues remained perfectly transparent, and underwent no shrinkage. It was in fact in a state of suspended animation. After being allowed to continue in this condition for an hour it was taken out of the amyl solution and put into a solution of ordinary tank-water at 80° Fahr., and in a few minutes began to float about, moving freely. It was watched for several days, and outlived many others which had been kept throughout in the ordinary tank-water.

In another inquiry of a similar kind two medusæ were placed at the same moment in the amyl nitrite solution. They passed through precisely the same changes as the last, became temporarily inanimate, and, on removal into ordinary tank-water, quickly and completely recovered.

This action of amyl nitrite indicates that the influence of the substance, negative in relation to the colloidal state, and causing no shrinking by the abstraction of water from the tissues. It was, I infer, exerted solely on the nervous ring, but without inflicting any permanent organic nervous injury.

This is what I observed between 1859 and 1864 in my original researches, conducted with the nitrite on frogs. In those researches every appearance of life was so completely suspended in the frog, that no indication of muscular motion could be excited by the galvanic current. In one instance external putrefaction commenced in the web of the feet, and yet restoration of life took place, and the animal made a perfect recovery.

SUMMARY AND COMMENTARY.

From the point at which we have now arrived, it would have been very important to have extended observation to the action of many other medicinal substances, the *modus operandi* of which is but little understood physiologically, and which are, nevertheless, considered to be potent agents in the treatment of disease. Here, however, I am obliged to stop, from the simple circumstance that the supply of the medusæ has suddenly failed. A wave of cold coming in one night led to the death of nearly all of them, and left those that were alive so feeble as not to be reliable for observation. It may be that there will be no further revival of supply until the early summer of next year.

In the meantime, the following inferences may, I think, be considered as fairly deducible from what has been observed and recorded.

I.

In the fresh-water medusa we have a form of animal life in which the nervous and muscular systems are presented in the most primitive type for action. An organic nerve, capable of stimulating muscular fibre into contraction, independently of a cerebral centre or spinal cord, is at the same time susceptible of impressions made on it by some refined medicinal substances, in the same way as the muscles of organic life are susceptible to such substances in animals of a higher order and in man himself. The substances tested, so far, are chloroform and its allied chlorides; ethylic ether; ethylic alcohol; and amyl nitrite.

II.

On this primitive organization the chlorides of the methyl series exert a double action: they excite to a contraction tetaniform in character, and they promote solidification, or, as Graham called it, pectosity of the colloidal textures, two results which hold the same relationship, the one to the other, that rigor of muscle holds to coagulation of fibrine or myosine.

III.

Alcohol, as represented by the ethylic variety, acts in a similar manner, but in a less determinate degree, and being soluble, is able to pass or dialyse through the tissues of the animal. By gradual administration alcohol becomes tolerated by the medusæ, and less fatal; that is to say, life becomes prolonged under its influence, although it may still, in the end, prove fatal.

IV.

Ethylic ether, less soluble than chloroform, and neutral as an excitant when compared with chloroform, is practically neutral in its action, even when the water in which the medusæ live is saturated with it, and when the surface of the water is covered with it. The facts suggest one of two points which have yet to be inquired into; namely, whether these animals can live independently of free and unmixed oxygen, or whether they are able, by oxidation, to break up the ether and utilize it, or render it inert in so far as their life is concerned.

V.

The action of nitrite of amyl in temporarily suspending the life of the medusæ, after completely paralysing them, is strictly in unison with the effects it induces in

the higher animals. This also corroborates the theory that the action of the nitrite on the higher animals is through the organic nervous chain primarily, and is only exerted on the cerebral centres and cord as a result of its influence over the function of the organic or vegetative nervous mechanism.

VI.

Another point of great practical moment occurred to me in observing the action on the medusæ of those agents which produce condensation of the coagulable colloidal structures. I have noticed in other experiments, conducted apart from vital acts in the strict sense of the word, that when fluid colloidal matter, like albumen, is distributed over a very wide surface or expanse, it is made to coagulate much more readily under the influence of condensing agencies than when it is acted upon by the same agents in mass or bulk. It may be, therefore, that colloidal matter when it is so infinitely distributed as it must be in the ultimate expanses of the circulation, is, as in the case of the medusæ, much more susceptible to separation by coagulation, than it is in the volume of the blood, or in the serum of the serous cavities. Should this view be true, it would account, in the most reasonable manner, for the first steps of many changes arising from obstructions and deteriorations in the ultimate structures of vital organs, which are now recognized without being comprehended in relation to cause.

COTEMPORARY PRACTICE AND LITERATURE.

"Every physician will and ought to make observations from his own experience ;
but he will be able to make a better judgment and juster observations by
comparing what he reads and what he sees together."—FRIEND.

THE GERM CRUX.

DR. FRANCIS TROUP, in an essay published in the *Edinburgh Medical Journal* for July, 1888, and since issued in a separate form, has contributed one of the most suggestive medical papers of the year up to this period of it. The essay is entitled *The Diagnosis of Early Phthisis by the Microscope*, and on this point the author adds largely to our stock of knowledge. He combines in the microscopic diagnosis of phthisis two elements of research: (1) the presence of broken-up elements of elastic tissue—"curly fibre"—(2) the specific bacillus. These being both present are an absolute diagnostic of pulmonary phthisis, although, prognostically, we are no better off for the bacillus than we were before. But the great point which Dr. Troup's essay raises, although by coincidence merely, is that which was originally advanced in the *ASCLEPIAD* four years ago in the article *Pestis Bacillorum*. When the bacillus origin of phthisis was first broached, how easily the origin of the disease was explained! Place a person in the way of infection, supply an atmosphere containing the germs of the

special bacillus, fertilize the lungs with germs as you fertilize a field with seeds, and there you are! The speculation was Dr. Dwight's animalcular notion resting on a microscopical and visible basis. It stood on analogy, always a dangerous part of controversy by the way, as Campbell the rhetorician so ably shows, but still so seemingly strong that there could be no mistake. Alas for speculation! The first objection to this hypothesis, feebly made for the most part, even by those who did not believe a word of it, was that phthisis pulmonalis is peculiar to certain constitutions. But if the fertilizing business were true, why should not every person be fertilized who breathes an air containing the germs? The germists replied, cleverly. All flesh is not one flesh even amongst men. In analogy, all fields are not one field. For seeds of plants fields must be ploughed or specially manured. So, in order that lungs may be fertilized by germs of the bacillus, they must be prepared for the fertilization, and that preparation is by heredity. This for a moment settled the question; but, again, alas for ingenuity resting on ingenuity alone! this explanation does not hold. Dr. Troup now shows, on the authority of Baumgarten, that the direct fertilization of the lung, tried by the most rigid experiment, is a failure; and that the inferences, so satisfying, as to the origin of phthisis by direct fertilization, must be modified or given up.

Does this admission play out the germ hypothesis? Not at all, but it calls up further ingenuity for support of the mushroom genesis. Ingenuity this time suggests that the germ of the bacillus is capable of passing from parent to offspring direct with the germ of the offspring itself. This it is that brings us back to the difficulty proposed in my argument of 1884, and which I now call

The Cruz of the Germ Hypothesis. I repeat that this hypothesis, if there be anything in it at all, must go far beyond the place which it now occupies. If the germs of the bacillus exist originally outside the human organism, in the air, or treasured up in solid or fluid inanimate media, as the germs of these low vegetable forms are supposed to be, and if they may be received from the outside by man and transmitted to other humanities with the germ of the homunculus itself, why may not the very germ of the homunculus be lying outside in the same manner, and the air be peopled, thick and thin, with men and women, invisible only in consequence of their own extreme minuteness? Then, indeed, the poet, with a word or two changed, is correct,—

“Myriads of human beings fill the air,
Unseen both when we wake and when we sleep.”

This is a momentous question indeed, born of the germ hypothesis of disease and inseparable from it. The microscopist looks at the spermatozoon. It is a living object; it is more of an object of life than a bacillus, for it moves, and it does not require to be coloured in order that it may be recognized. Where did it come from? Surely it came from a germ. But where did the germ come from? Does the germ come from the outside world, or is it generated in and by the organism in which the product of it was found? If it comes from the outside world, then we live in a world of germs, human and animal. If it is generated within the body, then we human beings and all other beings, by some unknown power, start in ourselves our own existences; and if we can do that for the propagation of our species, then surely we can do it for the propagation of disease.

In other words, this is the crux: Do we absorb, or do we secrete, *de novo*, the germ of a man, or the germ of a disease; and if diseases arise from germs, are they not existences like ourselves; and is not the ancient idea of diseases as entities, after all, a solemn truth?

The solution of these questions may lead to discoveries the strangest in human history, the first of which may be that the disease, or entity, known as syphilis is due to the human germ itself perverted from its original purpose and development.

THE "ANNUAL OF UNIVERSAL MEDICINE."

THE literary event in medicine of the past quarter is the publication—by F. A. Davis, Philadelphia and London—of the *Annual of the Universal Medical Sciences*, "a yearly report of the progress of general sanitary science throughout the world." We have had in the old country, for many years, remarkably good abstracts of the medical sciences; witness Ranking and Radcliffe's, which held so excellent a place; and Braithwaite's, which has become a medical household word. But in this new American abstract of universal medicine we are presented with a series of five large volumes, edited by an editor as learned and competent as Dr. C. E. Sajous—assisted by seventy associate editors and two hundred collaborateurs—and illustrated, throughout, by chromolithographs, engravings, and maps.

The volumes so prepared, after the model, it may almost be said, of a medical Septuagint, form, in point of fact, a respectable little library of medicine, and in a few years will become a veritable large library. The cost of labour has been prodigious, up to the hilt of the

indefatigable Dominic Sampson himself; and what the cost of production has been it were hazardous to suggest, for everything that money could do has been done, regardless of outlay.

The subject matter is divided into every conceivable part of medical science; and the main parts have again been subdivided, so that details stand out with abundant clearness. The sources of information have been of the most extensive kind, derived from every country where there is any pretence to a true medical literature, the bibliothetical list of itself alone forming a very comprehensive and useful digest and work of reference.

Of the quality of the literature of the work as a whole it would be difficult to speak in terms of too high commendation. Without attempting to read through all the volumes for this review, I have selected for reading those sections which deal with topics more peculiarly familiar to my own mind; and I am bound to express my admiration of the conscientious care and the erudition generally displayed. As a matter of course, there are mistakes, not of fact, but of method and style, for this was an inevitable result in the first issue of a work so comprehensive; but the mistakes are few, and will be sure to be detected and revised in future series by the vigilant editor. The gravest fault is that of occasionally giving information on particular topics without sufficiently defining the parts played by the authors who are being noticed, from those by the commentator. For instance, a medicine recommended by some author is being described, and prescriptions are given; but the recommendation, and perhaps the prescription even, is so rendered that it is not made precisely distinguishable from whom either

emanates. Again, a well-known disease is described as being of three kinds or classes; but this is put as if the commentator divided it into those classes, whereas he is really describing the divisions of one of the essays upon which he is reporting. These blemishes, errors of youth in a young work, will all disappear, and the Septuagint of Physic will become a standard of physic in the absence of which no medical practitioner's library will be truly a medical library worthy of the designation.

THE STORY OF CREATION.

(BY EDWARD CLODD.)

THE story of creation, told in the pages of this book (published by Messrs. Longmans), is intended to supply "a plain account of evolution." The intention is carried out to the letter; and in a handsome little volume of two hundred and thirty-two pages, enriched with admirable illustrations, Mr. Clodd has succeeded in laying before his readers, if not a romance in the ordinary sense of that word, a story which, once read, is not likely to be forgotten or left to rust on the library shelf. It would be difficult to find in any collection one which is more fascinating, more popular, in the truest sense of the word, or more exact without being exacting.

There are two parts of this volume: the first "descriptive;" the second "explanatory." In the descriptive part the reader is told the most modern views, from a scientific standpoint, respecting matter and power, and respecting power as (*a*) force, (*b*) energy. *Force* is described "as that which produces or quickens

motions binding together two or more particles of ponderable matter, and which retards or resists motions tending to separate such particles." *Energy* is defined as "that which produces or quickens motions separating, and which resists or retards motions binding together, two or more particles of matter or of the ethereal medium" of space. Energy, in its sum total in the universe, is a fixed quantity: it is not, like force, bound to matter; it can be transferred. "It exists whether it acts or not, and therefore it can be stored up," and it can be conserved. "Force is the attractive, or pulling, power; energy is the repelling, or pushing, power; and by the antagonism the work of the universe is done." An excellent tabular summary of matter and force concludes the first chapter of the book in which these descriptions are given. The "distribution of matter in space," the sun and the planets, "the past life history of the earth," and "present life forms" are the succeeding chapters of the first, or descriptive, part, the last chapter being of intense interest to those physicians who, following the grand advice of Professor Gairdner, would be naturalists as well as prescribers. In sixty-five pages there is here condensed, better perhaps than in any extant book the present life history of the earth, the whole being brought to a close by a diagram of development, a kind of map of the life history of the planet, which supplies at one view or glance the ascent of the higher life forms from the lower, in clearest style. In the second part of the volume, the universe, the mode of its becoming and growth, the origin of life, the origin of life forms, the origin of species, the proofs of the derivation of species, and social evolution are the subjects discussed, in separate chapters, the last chapter containing some fine

passages on the "Evolution of Theology," and forming a splendid conclusion to a book essentially of the time—"its form and pressure."

TREATMENT OF MIGRAINE WITH INDIAN HEMP.

(BY RICHARD GREENE, M.R.C.P. EDIN.)

DR. GREENE, in the short essay—reprinted from the *Practitioner*—now under notice, advocates in an earnest and practical tone the employment of the alcoholic extract of the cannabis indica in the treatment of migraine, and adds to his own experience, which is exceptionally large, that of Dr. Walters, of Stonehouse, Gloucestershire. Dr. Greene is a critic on the action of drugs, and it may be at once conceded that when he writes in commendation of any special medicament he has witnessed results on which the utmost possible reliance may be placed. Cases of migraine relieved or cured by cannabis cannot, he observes, be relegated to the chapter of accidents, and he affirms that the treatment is not merely palliative during a paroxysm, but "is often curative and nearly always gives some lasting relief." In his hands he is confident that recovery has more frequently followed the use of cannabis indica in migraine than of bromides in epilepsy. His "experience would further lead him to believe that cannabis is more useful in women than in men, probably because migraine in women is often accompanied by some irregularity of the uterine functions, and cannabis has long been credited with some specific action on the uterus."

"It is necessary," he says, "to persevere with the

treatment for at least many weeks. Dr. Seguin followed the excellent plan of obtaining from his patients a promise that they would take the medicine for three months. It is, however, usual for improvement to show itself earlier than at the expiration of three months; and when decided relief is felt, there is not much fear but that perseverance in the treatment will follow the improvement, as migraine is the reverse of a pleasant companion, and often unfits its victim for an active life several days in every month.

“The alcoholic extract is the best form of the drug to prescribe, and nothing but the freshly made preparation can be relied on. It is very necessary to insist on this. One-third of a grain made into a pill and taken every night, or every night and morning, is generally sufficient to begin with, and in severe cases the dose may be quickly raised to half a grain or two-thirds.”

Dr. Greene has never seen unpleasant symptoms follow this course, except in the case of a patient who foolishly took a double dose before breakfast, and in whom slight, but not alarming, toxic effects were produced. It seems certain that more than one grain should never be given except to patients habituated to its use, and even in them he would not order so much unless the extract were part of the specimen from which the same patient's last prescription had been made up. The British Pharmacopœia correctly gives the dose at from a quarter to one grain, while in Christison's "Dispensatory" it is put at from two to five grains, a statement which can only be explained by supposing that the extract used was either old or carelessly prepared. Still it would seem not to be generally looked on as a poison.

Unlike opium, no craving for further doses follows the medicinal use of the extract; and apparently it can be given up without the slightest effort at any time.

MEDICINE IN ANCIENT INDIA.

(BY SURGEON-GENERAL C. A. GORDON, M.D., C.B.)

THE essay bearing the above title, from the pen of Surgeon-General Gordon (published by W. H. Allen & Co.), consists of an address delivered before the members of the St. Andrews Graduates' Association on June 15th, 1887. We who were present at the meeting referred to remember well how delighted all were with the picture which our learned brother drew of the Devas, the "shining ones" of ancient India, and the poets and philosophers of a golden age. The part which struck the medical listeners most was that which related the physician's calling during the Vedic period and the legend of the physician who was "churned up" by the gods of Hindostan out of the "milky sea," bearing in his hand *Amrita*, the water of life, the drink of the immortals. We heard described, with great pleasure, the personal qualifications of the good physician of that distant time, namely, morality, veracity, knowledge of ancient literature, sense, benevolence, placidity of temper, his constant thought how to do good, his daily study professional books. We received with equal delight the account of the relations of the physician towards his patient: that he is not to be provoked to impatience when his patient expresses himself peevishly, to be mild, yet courageous, and to cherish the hope of saving the life of the sick;

so that when death occurs under the care of a physician thus portrayed the event may be looked on as inexorable fate, not as the consequence of presumptuous medical ignorance. These and many other curious and wise pieces of intelligence from a world of wisdom long since forgotten in Western life, and only too slowly coming back to life again, make up this remarkable and classical addition to modern medical literature.

THE INFLICTION OF CAPITAL PUNISHMENT.

THE disgusting details of the gallows which have been reported by the public press have led two of our medical members of Parliament, Dr. Farquharson and Sir Tindal Robertson, to call attention to the subject, with the view of obtaining what is called a more humane mode of executing criminals. Sir Tindal Robertson has put a question to the Secretary of State for the Home Department asking if the Government intend to introduce any new plan, by electricity, injection of morphia, or the lethal chamber. On the first of these methods I commented in last ASCLEPIAD, and need not renew the argument. On the second, the injection of morphia, little need be said, and nothing in commendation: it would be slow as a process, might be very uncertain, and would call for some man of science to carry it out, an office which no man of science worthy of the name would undertake. Of the lethal chamber, which I have invented for the euthanasia of the lower creation, I can only say that I trust it may never be prostituted to such a base and idiotic purpose as that of being made a chamber of death for criminals; for there are criminals who will seek it for no other purpose than

euthanasia, and for this it was never intended. While expressing myself thus freely, as one entirely opposed to capital murder in any form, I join sincerely with those who, like Dr. Farquharson and Sir Tindal Robertson, protest against letting the common hangman kill on the scaffold in any way he likes. The law is laid down by the judge as to the mode: the criminal is to be hanged by his neck until he is "dead! dead! dead!" The executioner has the audacity to change this sentence, and to kill by a shock or fall, thus converting a rude but painless death into one that is probably the most excruciating that can be inflicted. This utterly illegal act the Secretary of State can by one humane order rectify. It is an innovation of the most wanton kind, it is dead against the tradition and practice of centuries, and it ought instantly to be forbidden.

TO CORRESPONDENTS.

Books, Reports, and Pamphlets intended for notice in THE ASCLEPIAD should be addressed to the Author at his residence, 25, Manchester Square, London, W.

Names of Subscribers and other Matters of Business should be forwarded to Messrs. Longmans, Paternoster Row, London, E.C.

Advertisements, and all Communications respecting them, should be forwarded to Mr. A. P. Watt, 2, Paternoster Square, London, E.C.

The Author will be greatly obliged if senders of Newspapers and Magazines would kindly mark the passages to which they wish to direct attention.

August
15th,



1888.

APPENDIX OF ACKNOWLEDGMENTS.

EXCHANGES.

"The New York Medical Journal." "Journal of Chemical Society." "Journal of Society of Arts." "Chicago Med. Journal and Examiner." "New Orleans Med. and Surg. Journal." "Sacramento Med. Times." "Monographia Syphilitica." "Illustrated Science Monthly." "New England Med. Monthly." "Chemical News." "Clergyman's Magazine." "College and Clinical Record." "Glasgow Med. Journal." "Bristol Med. Chir. Journal." "Australasian Med. Gazette." "Journal of Mental Science." "Quarterly Journal of Inebriety." "Sanitary Journal." "Hygiène Pratique." "Med. Temperance Journal." "The Polyclinic." "Asylum Journal." "Journal of Microscopy." "Longmans' Magazine." "Gentleman's Magazine." "Belgravia." "Chemist and Druggist." "Health." "Sanitary World." "Journal d'Hygiène." "Malthusian." "Animal World." "Scientific American." "Bollettina della Società Fiorentina d'Igiene." "Med. Record." "Bulletin de l'Académie de Médecine." "Liverpool Med. Chir. Journal." "Medico-legal Journal." "Hospital Gazette." "Journal Scottish Meteorological Society." "International Journal of the Med. Sciences." "Journal of Heredity." "The Health Journal." "Science Gossip." "The Med. World." "The Photographic News." "Edinburgh Med. Journal." "The Wayfarer." "South African Med. Journal." "Phrenological Magazine." "Med. and Professional Review." "Vegetarian Messenger." "The Analyst." "The China Med. Missionary Journal." Shanghai: 1887. "Seances et Travaux de l'Académie des Sciences" No. 5. Par JULES SIMON. Paris: 1887. "Hygiejniske Meddelelser." No. 3. Kjöbenhavn: 1887. "The St. Louis Med. and Surg. Journal." "The Journal." "Our Good Words." "The Canada Health Journal." "The Draper's Record." "The School Board Chronicle." "The Writer and Reader." "Our Day." "The Scientific Inquirer." "Public Health."

REPORTS AND TRANSACTIONS.

"Report of Med. Officer of Health on River Tyne Port." Newcastle: 1888. "Report of Royal Normal College and Academy of Music for the Blind." Norwood: 1887. "Report of the Honourable the Commissioners of the Sewers of the City of London on Tramway Projects Company." By W. HAYWOOD, C.E. January, 1888. "Annual Report of the Church of England Burial, Funeral, and Mourning Association." London: May, 1888. "Report of Surgical Cases admitted into the London Temperance Hospital during 1888-4-5." London. "Twelfth Annual Report of the Australian Health Society." Melbourne: 1887. "Annual Report of United Kingdom Band of Hope." London: 1887. "Report of the Anglo-Jewish Historical Exhibition." London: 1888. "Report of National Vigilance Association." London: 1887. "Report of the Homes for Inebriates Association." London: 1887-8. "Report of Lunatic Hospital for the County and Town of Nottingham." Nottingham: 1888. "Seventh Annual Report of the State Board of Health of New York." Albany: 1887. "Sixth Annual Report of the London Municipal Reform League." London: March 28th, 1887. "Fourth Annual Report of the Leasehold Enfranchisement Association." London: 1887. "Annual Report of the Devonshire Hospital and Buxton Bath Charity" for 1887. "Report of Works executed by the Honourable the Commissioners of Sewers of the City of London in 1887." London: 1888. "Annual Report of St. Marylebone General Dispensary and Samaritan Fund." London: 1888. "Report of Sussex Temporary Home for Lost and Starving Dogs." Brighton: 1887. "Report of Medical Officer of Health on the Sanitary Condition of Newcastle-upon-Tyne, with tabular returns of Sickness and Mortality during 1887." Newcastle-upon-Tyne: 1888. "Seventy-fifth Annual Report of the Royal Edinburgh Asylum for the Insane." Morningside: 1887. "Annual Report of United Kingdom Band of Hope." London: 1888. "Report of Bread and Food Reform League." London: 1888. "Annual Report of Society of Training Teachers of the Deaf and Diffusion of the 'German' System for year ending 1887." London: 1888. "Monthly Bulletins of the New York State Board of Health." New York: 1887-8. "Monthly Bulletins of the Iowa State Board of Health." Iowa: 1888. "The Thirteenth Annual Report of the Ladies' Sanitary Association." London: April, 1888. "Proceedings of the Society for the Study of Inebriety." Nos. 14, 15, 16. London: 1887-8. "Proceedings of the Royal Society." Nos. 258, 259, 260, to 269. London: 1887-8. "Proceedings of Grand Lodge, State of California, 1887." Sacramento: 1887. "Proceedings of the Physical Society of London." Part III. July, 1888. London: 1888. "Transactions of the Odontological Society of Great Britain." No. 6. London: 1888.



PRACTICAL NOTES ON THE MORPHINE HABIT.

THE first number of the ASCLEPIAD opened with an essay on "Morphia Habitues and their Treatment." Five years' longer observation on the morphine habit has greatly enlarged my course of experience upon this strangely practical subject, and I feel that it were not easy to close the fifth volume of this work with any better task than by adding to what I originally wrote some details of the information subsequently acquired.

In respect to the acute symptoms belonging to morphine intoxication I have nothing new to say. They were described in the essay of 1884 from nature, and as a matter of necessity they remain the same. But there are one or two facts bearing upon the chronic effects of morphine addiction which time alone could supply, and which are worthy of note as modifying, and it may fairly be said adding to, our knowledge of the subject in whatsoever light we may look on them.

The first of these facts relates to the effects of the narcotic on those who, having become habituated to morphine until it seems to them a necessity and as

it were a kind of food, are, nevertheless, able to regulate the use of it and to remain steadfast in the rule which, according to their view, is best for them. In certain instances of this kind the narcotic has, I confess to my surprise, been systematically taken with results so completely concealed from ordinary observation as to be out of range of detection, except by the admissions or confessions of the habitués themselves.

Of this fact one experience is singularly striking : first, because it is representative ; and secondly, because the person most concerned has been good enough to permit me to publish a letter in which he communicates the history of his case and the character of the morphine habit as a part of his life. This gentleman's case was noticed in my previous essay. He had then, in 1884, been a morphine habitué for some years, and he continues as such to the present hour.

My correspondent begins by telling me some of the peculiarities and struggles of his life up to the age of forty years. These events are marked chiefly by three leading facts, which bear on his record as a morphine habitué. (1) That he was obliged to live by learning and teaching, often with much severe difficulty, on his part, to learn. (2) That he suffered—as they of exceeding nervous impulse frequently suffer—from neuralgia and “protean dyspepsia,” with, for a time, saccharine diabetes. (3) That under these conditions he broke down in health ; by rest recovered and recommenced to study, taking up new subjects for work ; but in time was revisited by the dyspepsia with a degree of irritability, mental and bodily, which was most painful both to himself and to those around ; while his dietary, limited to some four or five simple articles of food, agreed with him so badly that he was obliged after dining

moderately to spend three or four hours on the sofa, "chewing the cud of ennui and bitter thoughts."

This state of things went on for ten years and he had reached his fiftieth year. Circumstances now made him acquainted with the hypodermic injection of morphine. He had been obliged for several months to apply it to another person in the absence of a doctor, and had read Lawson's work on Sciatica, in which that method is advised as the only one known for dealing effectually with that malady; he determined, therefore, "next time he perceived the approaches of that ancient foe, to meet it with that novel weapon."

THE PERSONAL NARRATIVE OF A MORPHINE HABITUÉ.

"The opportunity," says my correspondent —whose narrative from this point is rendered in his own words, —"soon came; and the remedy was effectual. That is now ten years ago, and I have never had more than a twinge of sciatica since. At first I only injected morphia now and then, and when it was needed to prevent positive pain; but, by degrees, I slipped into the habit, and found much difficulty in breaking it off. Many years before, a leading physician in London had advised me to take morphia, in very small doses, as a sedative, when suffering from pain and irritation in the lumbar-spinal region; but it aggravated my dyspepsia to such an extent that I was compelled to discontinue the habit. Now, using the same drug hypodermically, I was surprised to find that it not only did not increase dyspepsia, but even entirely prevented it; and by degrees I have widened my dietary under its beneficent influence to such an extent that I am no longer on the dyspeptic list at all.

Another effect of the morphia habit has been to cause me almost wholly to desist from alcoholic drinking. To me alcoholic drinks were ever a sedative rather than a stimulant, and a comparatively digestible substitute for solid food, which I was wholly unable to digest in adequate quantity to support my life and work. When working hard I generally drank a bottle of light claret* in the day's course; and, pressed by extra work, would add a glass or two of toddy—with no perceivable ill effect; but now, though working even harder, I feel no need of the sort. More remarkable is the effect upon my temper, my memory, and my spirits, my complexion and circulation—and, indeed, my general health. To those I lived with my temper used to be a dreadful trial, and to me even a worse one; but now I rarely feel irascible, and have much less difficulty in keeping the reins over myself. Again, in my sixtieth year, I have a better memory than in any previous year; I have a clearer and ruddier complexion, a cleaner tongue, and a far more regular and stronger heart-beat. Indeed, my heart almost always beat intermittently under the influence of dyspepsia in my pre-morphian days, and for several years my medical attendant believed, and assured me, that the left ventricle was dilated and weak, a view which post-morphian investigation has entirely dispelled.

“By degrees, as I said, I formed the *habit* of injecting morphia; not, however, without having carefully studied and considered the dangers, alike physical and moral. As regards the latter, it would be difficult to exaggerate them, both in relation to the difficulty of breaking off

* “Tea is to me an intoxicating stimulant.”

the habit and in reference to the still greater one of controlling it. To start with a knowledge of human physiology and of my own moral infirmity were, doubtless, strong points in my favour; at any rate I am able to say, now that ten years have passed since I first injected morphia, that I did, at an early stage, succeed in giving up the habit altogether on several occasions—and believe I could do the same again if I thought it desirable; and, further, I have never allowed the habit to become my master, but on every occasion on which I have exceeded the norm I laid down for myself I have soon afterwards returned to the right side of the hedge; and, what is more, having about a year ago seen reason for believing that I had set my standard too high for my ultimate health, I deliberately, and easily, and rapidly, diminished my daily quantum by one half—*i.e.*, from five grains, or a little more, to two and a half grains, at which I stand.

“ You will naturally ask—after perusing my narrative, all glowing as it is with *couleur de rose*—whether there are no drawbacks which, in honesty, ought to be stated. There are such, but they weigh, in my judgment, but as dust in the balance when compared with the advantages. First, then, my imagination is at times heightened to an exaggerated extent, though since the reduction this effect has been very slight indeed. I used, however, to be subject *occasionally* to strange and most unpleasant and unaccountable terrors—*e.g.*, in passing through a railway tunnel, and in awaking in the dark. I became conscious, too, that though, on the whole, the effect of the morphia habit has been very largely to calm and give balance to my constitution, bodily and mentally; yet I was liable to take, *at times*, extreme and exaggerated views of points—*e.g.*, in

controversy and the like. But once detected this danger was easy to counteract. Again, there is a curious experience of which I am the subject now and then: When walking suddenly the nervous force to my muscles seems to *forget to run*, and for a second no stimulus reaches the muscles. I have at such times to stand still and wait, helpless, a few seconds for the stimulus to renew its course. In general, the muscles, especially of the legs—always a weak point with me—seem further weakened. As regards my nervous system, a medical friend acutely remarked of me, in the pre-morphian era, that the balance was not properly held as between the cerebro-spinal and the sympathetic systems of nerves—the former monopolizing far more than its share of nutriment and force, and the latter being impoverished and enfeebled. Now, however, the adjustment seems to my sensations and observation quite harmonious. I am not everlastingly self-driven, as of yore, to over-think or over-work. I *enjoy* life far more each year than formerly; and my heart is comparatively at ‘leisure from itself,’ not only ‘to soothe and sympathize’ with others, but also to observe. My brain was too active to observe external things, works either of Art or Nature, formerly. Now, in my old age, I am beginning to look at pictures and at things around me. But this, though named among the ‘drawbacks,’ is not so felt by me. Another drawback is that the liver and bowels—perhaps the bowels because the liver—are less active than they should be, so that I am obliged to take now and then a cholagogue. At one time, too, when I took the drug in the strongest possible dilution (double the officinal strength), I suffered terribly from abscesses at the points of puncture; but since I increased the proportion of water that great

discomfort has ceased. At different periods of my life I have tried a great variety of dietetic and other experiments, with a view to better health. Tobacco and no tobacco, alcohol and teetotalism, meat-eating and vegetarianism, cold-bathing and Turkish baths, homœopathy and mesmerism—but all were useless. One insuperable difficulty that beset me was to succeed in sleeping. Each day was planned with a view to a good succeeding sleep, but every means was ineffectual in many cases, and a bad night was always followed by a miserable day. Now, however, I sleep on the average at least nine hours nightly, and not infrequently ten or even eleven hours refreshingly; and nights of that sort are followed by days in which I am able to study or compose (with sometimes a change to mechanical work) for from eight to ten hours, without being exhausted.

“Of course, as one swallow does not make a summer, one decade of a life does not prove how the end will be. But ‘so far so good’ may certainly be said. And whatever follows, I can never, I think, regret the gain which I have got through morphia. Many raven-like prophets boldly declare that only evil ever eventuates from such a habit. It may have been so hitherto, but my rejoinder is as follows: ‘Can anyone cite a case in which ruin has followed the morphia habit, ruin either of mind or body, when the patient and not the habit has been the master, quantum not being continuously increased?’”

PRACTICAL COMMENTARY.

In this very interesting series of statements and experiences we get what may be considered one of the ablest apologies for the morphine habit, an apology which really mounts into a defence. I have heard this

same apology, though not so eloquently set forth, many times from other persons. Dr. Lawson, to whom my correspondent has referred, and who frequently consulted me, used a very similar line of argument. It is an argument which the physician, who wishes to be strictly just, must meet as a practical reality.

The question is how it is to be met. Are we who listen to it to accept the reasoning, or are we systematically to oppose it?

In answering this question let me make at once an observation which goes immediately to the root of the matter. It is this: that whatever we may say, whatever we may think, whatever we may do short of a rigid physical restraint—which the law would prevent us from carrying out if even we had the will or desire to carry it out—we are powerless to arrest the morphine habit when once it is positively confirmed and has taken thorough hold. In this respect the habit is more tenacious than the habit of taking alcohol, bad as that is. The moderate, the temperately immoderate, nay, the absolutely immoderate, alcoholic, may be brought to abstain altogether from alcohol, though accustomed to that drug from his early days. But with the confirmed morphine habitué this event is the rarest of all events of its kind. Few physicians in our country have seen a larger number of morphine habitués than I have. They have come to me from all parts of the world and from all professions. I am cognizant of some who, in the midst of active lives—and active public lives—retire in the course of their day's work to take their dose of morphine as other men retire to take their nip of spirits or their glass of wine. In the presence of this experience, extending over many years, I have never yet known an instance in which I could be quite sure that

the fully confirmed habit has been absolutely or permanently abandoned. I may have heard of such cases; I have seen none. Sometimes a patient has come to me, and under urgent advice has, to the best of my knowledge, abstained resolutely for a time, and been, so to speak, "discharged well." But after a longer or shorter period there has been a relapse, and a steady return to the habit.

Under this unmistakable experience I have well nigh given up the idea of absolute cure. At the same time there seems to me no valid reason for thinking that treatment is useless or in vain. On the contrary, treatment toned and modified by the above-named experience is of greater service than it would be without it, and to impress this fact on the mind of my brethren is one of the principal objects of the present essay, as I now proceed to indicate.

The correspondent who has favoured the readers of these pages with his personal experience has most correctly divided the morphine habitués into two great classes—namely, those who can control themselves in the habit and those who cannot. Neither class can give it up entirely, but one can keep it within limits, while the other cannot. One class rules the habit; the other class lets the habit rule it. We must recognize this distinction in considering treatment.

In such a case as that presented by my correspondent the habit is fixed, unalterable. The combined Faculty of Physic could not persuade the gentleman in question to give up the use of the morphine. The drug has become to him a kind of food; and, according to his views, it has relieved him of a set of symptoms which made his life a bitterness; so that, putting one thing against another, it has on the whole rendered his life

happier, more useful, and in a sense healthier, than it was before he acquired the habit. If one of us changed places with him in regard not only to the circumstances but to the idea or belief to which those circumstances have given birth and fixed existence, we, probably, should be as confirmed in the habit as he. I am inclined, therefore, in this class of case, to let the treatment enforced be earnestly directed to the reduction of the morphine to the smallest possible quantity. It is noticeable in almost every case—my experience would include every case—that there is an entire willingness on the part of these patients to reduce an excessive dose. Thus, in one case, where the extraordinary dose of over ninety grains in twenty-four hours was taken regularly, I had no difficulty in getting a gradual reduction to four grains in the same period. But beyond this reduction I have been utterly unable to succeed; the reason of the arrest of success at the point named being, according to the habitué, the very cogent argument that he can reduce to the quantity specified without feeling “injured or affected by the reduction,” but the moment he passes that degree he is thoroughly reduced in power mentally and physically. In other words, the minimum or acquired dose for him is four grains daily; under that his life goes on with even tenor, whilst all above that is superfluous. He is content, therefore, to live at the minimum, and there he can control himself. Press him to reduce below the four grains, or to stop the habit entirely, and there is a change for the worse, even in the habit. He recommences, and runs up above the minimum before he comes down to it again.

In regard, then, to the treatment of those who, having acquired the habit, can control it, I now do my best at first to remove it altogether; failing in this,

instead of taking what may be called forcible means to ensure entire abstinence, I remain content with reducing the dose to the minimum. It is a plan not altogether consolatory, but it is practical, and is the outcome of a necessity which knows no law.

It is necessary next to enquire whether under the minimum dose any serious evils are to be found, whether any organic changes are induced which shorten life. To this question there are two answers. In some patients, as in my correspondent, any evil effects that may arise are balanced by certain compensatory advantages so fairly that the good may be set against the evil. It may be possible, in rare instances, to say something more. The course of the disease diabetes mellitus may be controlled by the habit in the most remarkable manner—a fact I have witnessed in two examples at least. I believe, also, from direct observation, that the habit has a more controlling influence in cases of developed cancer than any other kind of so-called curative art. As we have seen, there are symptoms of a neuralgic and hyperæsthetic character in which the morphine relieves physical pain and calms mental perturbation. It is just to accept these results as measures of good; and according to my present views, in examples similar to those just cited I should “let well alone” as a general rule, unless any special symptoms, belonging exclusively to the action of the narcotic, should supervene and suggest danger. Hitherto, I have failed to see any such symptoms under the minimum dose, for morphine is different from alcohol in respect to the production of special organic changes. It induces general symptoms when excessively employed, and is then a cause of feebleness and of a form of general paresis, which might be called

morphine paresis; but the dose must be an increasing, exalted to an excessive, one before this occurs.

Turning to the class of persons in whom the habit cannot be controlled by any effort of their own, there is presented to us a more troublesome and more difficult practice. In the persons named, it is often necessary to enforce, to the fullest possible degree, the principle of entire abstinence. Here, again, I continue to follow the rule described five years ago, of reducing the dose by short and systematic reductions, in preference to making the attempt of instant withdrawal. In this endeavour I have found it easier to advise the patients who have least control over their own actions than the stronger minded; and have even succeeded in inducing them to give up the habit, for the moment, entirely; but the success, at the best, is sustained for a very brief period, and the return to the habit is often attended with a recklessness and rash persistency which ends in greater mischief than ever.

With those who have no self-control, the difficulties of treatment are terribly increased. They fly to the narcotic without the slightest reason, whenever anything annoys or troubles them. The mere act of self-administration becomes automatic: like desperate smokers who find a kind of solatium in recharging the pipe, these find the solatium, as they think, in charging themselves with the alkaloid. I have seen one of them doing it whilst protesting against the act and declaring its imbecility.

The only possible treatment, when absolute abstinence fails, is to try and find the minimum dose that allays the craving, and to insist that no larger dose shall be taken. A grain a day will often satisfy, and

when it does the rule of "letting well alone" is, I am sure, the safest and best.

HYGIENIC TREATMENT.

It is important in treating morphine habitués, of both classes, to introduce diversion of mind and exercise of body as curative measures. These are admirable means towards the desired end, and accomplish far more than any harsh and determinate effort to enforce unqualified abstinence. For mental exercise it is good to advise music, singing, the committal of readings to memory, reciting, learning puzzles, and practising intellectual games like chess. For outdoor exercise and pleasure, games and pastimes which call forth a great deal of muscular exertion and some competition, without causing the fever of fatigue, are splendid remedies. The poison of idleness is the ally of the narcotic poison, and the two work together so like one that it is hard to distinguish between them. The one calls also for the other, whilst exercise disperses both.

Friends who come to the physician with morphine habitués are too often disposed to make over much of the habit and its consequences. By this process they annoy the patient, and by constantly dinning the matter into him, or her, make the slavery of the habit more pronounced. It is a good rule to warn friends on this point, and to instruct them as to the proper management of the habitué in the home circle. It should be recommended to treat the craze for the drug as lightly as possible; to do everything to divert the mind from it; to avoid dwelling on the topic or even touching upon it; and to encourage the cultivation of every mental and physical exercise that shall

call the mind and body into new pursuits. Above all things, perfect candour towards these habitués should ever be the order of the day, for they resent deceit as easily as they follow it.

MEDICINAL TREATMENT.

It is always a good point of practice to prescribe useful corrective remedies for the morphine habit. In the desire to suppress the habit out and out, as *the* one effort of practice, I was accustomed, at one time, to neglect this branch of healing, in which I am sure I was wrong. The patients under notice are favourable to treatment by medicine, and will willingly let the habit stand aside to a great extent, for a prescription that has a definite purpose. They are also benefited by some medicines to a considerable extent. I think I may say that they are invariably benefited by the judicious administration of purgative medicines of the saline type. A dose of sulphate of magnesia, two to four drachms, with a grain of sulphate of iron, and half a fluid drachm of syrup of ginger in three ounces of water, is an excellent purgative. It removes the mental depression, and languor, which minister to the habit so strongly, in a very efficient manner.

When the tongue is loaded, the conjunctiva a little yellow, and the appetite indifferent, I usually prescribe the following mixture, with good effect:—

R Acid. nitrici dilut. ℥ij.
 Tinct. nucis vom. ℥jss.
 Liq. taraxaci ℥jss.
 Infus. aurantii comp. ad ℥vj.
 M. Fiat mistura ℥vj.

Dose, one-twelfth part two or three times a day, in a wineglassful of water.

This mixture seems to be specially suitable for the sufferers from the morphine habit. It reduces the craving, and it favours the digestion of food.

The question is usually asked: Is there an antidote for the morphine, any drug which destroys the craving for it? The answer, I am sorry to say, is negative so far. I have thought that in a recent case I have seen some good from the administration of belladonna, but I must wait for more light before I venture on any statement of a definite kind.

One word more as to the endeavour to stop the habit by immediate control and systematic withdrawal of the narcotic from the habitué. Presuming that the habit has been quite recently acquired I do not dispute that the attempt may be made with a chance of success. If made, however, it must be systematically and thoroughly done, under the most rigid medical supervision. There must be no playing with the trial. The strictest watch must be sustained, and the symptoms, always urgent, which follow upon the withdrawal must be met as they arise, with firmness, kindness, and judgment. Moreover, when the symptoms have passed away, medical supervision, unbroken, must be kept up for three months at the shortest. All this demands residence in a house where every convenience for the treatment is at hand, and where a trusted and resolute physician is always at his post. The attachment of such a home to one of our existing great medical institutions in the larger centres of life of this kingdom is a project that deserves serious and immediate consideration.

THE ART OF EMBALMING.

CONCLUDING ARTICLE.

EMBALMING WITH A POST-MORTEM EXAMINATION.

IT occasionally happens that a body which is to be embalmed requires to be subjected to a scientific examination in order to determine the cause of death. Under such circumstances the process of embalming is more complicated than has been described in the former parts of this essay; but if the operator who is to embalm may himself make the post-mortem inquiry, the difficulties that are added need not be very great.

In conducting the post-mortem the incision along the body must be made in one straight line only: the two lateral incisions usually made beneath the diaphragm are to be omitted. The skin must then be very neatly reflected from the chest, without cutting through muscular fibre; the cartilages of the ribs must be divided with evenness and regularity, and the division must not extend quite so high upwards as the sterno-cleido articulation. When the incision through cartilage has been carried on each side up to the point named, the sternum is to be carefully divided transversely, and the anterior part of the chest-wall that has thus been separated is to be removed altogether.

The thoracic viscera having been exposed, the viscera of the abdomen are to be laid open by a straight incision, in the line of the linea alba, through the peritoneum. The diaphragm should be left in position and without injury.

The examination of the viscera may now proceed as usual, after which all the viscera that are to be left in the body should be freely saturated by needle injection with the zinc chloride solution; and the intestinal tube, tied at its upper and lower part, should be saturated with the solution.

If it be necessary to make an examination of the contents of the cranium, that must next be proceeded with in the usual way, but with more than usual care. The skull must be cut through with a fine saw, and the line of the incision made by the saw must be exceedingly regular.

If the brain, after examination, be returned, it must also be treated freely with the preserving solution.

Next, the surfaces of all the visceral cavities are to be painted over with the preservative, and the organs are to be returned to their respective cavities. If there are no organs to be put back, the cavities should not be left empty, but should be filled with gypsum, to which has been added a quarter part, by measure, of tannin and a little gum benzoin or myrrh to give a fragrant odour.

To replace firmly and neatly the anterior part of the chest-wall and to retain the separate parts in a fixed state, it is requisite to bring the ends of the divided ribs carefully into apposition, and to bind them with iron or silver wire. It is good to use for this purpose a small archimedean drill, in order to bore a hole through the bone on each side, to pass a loop of wire through,

and with pliers twist the ends of the wire firmly, cutting them off not too closely. To fix the calvarium five wires are required, two for the parietal part, one for the centre of the occiput, and two intermediate. No wire need be inserted in the frontal space.

The divided integuments of the abdomen and head are to be brought neatly together with thread or silk by the close small suture.

After the whole of the divided parts are completely closed, the process of subcutaneous injection with the zinc solution must be carried out precisely as directed in the preceding essay, except that more fluid must be thrown into the cellular tissue. The injection of three pints of the zinc solution into the cellular structure is not too much, and it can easily be introduced by injecting it in small quantities at many points of the surface of the trunk and limbs. Finally, the swathing of the body in the bandage saturated with the tannin and benzoin solution will complete the process.

This modified mode of embalming with a post-mortem can be made exceedingly perfect. It may indeed be made as perfect as if there had been no post-mortem; but it calls for more time and requires more care.

ON CERTAIN PRESERVATIVE FLUIDS.

Before I conclude this subject of embalming, I would like to add a few pages of description on the art of preserving museum and laboratory specimens in preservative fluids. For such specimens, fluid preservatives are mainly useful. In the museum and laboratory the use of wine spirit—ethylic alcohol—has long held the first place, but of late years methylated alcohol has been commonly used, owing

to its cheapness. These alcohols preserve perfectly, but they are expensive, and they always bleach and destroy the flexibility of the structure that is immersed in them. Some other fluids, therefore, come in well for general use. I will give a few of the best.

Ammonia Solution.

Strong liquid ammonia (sp. gr. .882) is always useful as a preservative. Twenty to thirty minims diffused in a pint jar well closed will preserve anatomical parts for many years. Ammonia is the readiest and one of the best vaporizable fluid preservatives known.

Bichromate Solution.

Mr. Savory, who always makes some useful addition to our knowledge on the rare—I regret to say too rare—occasions on which he speaks, described more than twenty-five years since the then new fact that bichromate of potassa is an admirable preservative when used in solution. The solution is made as follows :—

Potassa bichromate, 8 grains.

Water (distilled), 1 fluid ounce.

This solution preserves and does not harden the structure. It rather destroys colour, causing a change towards a greenish tint. To prevent this, the following modification may be adopted :—

Potassa bichromate, 8 grains.

Potassa nitrate, 2 grains.

Water (distilled), 1 fluid ounce.

Both solutions keep very well, and in using them nothing more is necessary than to suspend the specimen to be preserved in a preserving jar, and afterwards add the solution.

Zinc Colloid.

Zinc colloid is a fluid I have myself introduced, and it is useful where it is necessary to preserve and at the same time fix or harden a tissue. The preparation is made as follows :—

Tannin, 10 grains.

Alcohol (sp. gr. .880), 4 fluid drachms.

Tincture of benzoin, 1 drachm.

Colloidon, 8 drachms.

Zinc chloride, 5 grains.

Dissolve the tannin first in the spirit; add the benzoin and the colloidon, and finally drop in the zinc chloride in very small pieces and slowly, until a complete solution of it is secured. This preparation is laid on to the structure with a brush. Very little of it is required.

Carbolic Colloid.

Another preparation in the colloid form is made as above, but instead of zinc chloride, carbolic acid is introduced, in the proportion of three to five grains to an ounce. This solution, laid on with a brush, preserves membranous structures very efficiently for a long time, but it is less permanent than the zinc colloid.

Diffusible Creasoted Fluid.

For spongy textures, and for fur, feathers, or hair, creasote answers admirably if it be neatly applied. For this purpose the following solution is good :—

Pure beechwood creasote, 10 minims.

Amyl hydride (sp. gr. .620), 1 fluid ounce.

Let the creasote dissolve in the hydride; stop the bottle well and keep in a cold place.

In using this solution, it is only necessary to pour a little of it on the specimen to be preserved, and then gently blow with the warm breath over the part where the solution has been laid. The light amyl hydride, which boils at 88° Fahr., will all evaporate instantly, and will leave the creasote in a state of the finest subdivision, on the structure.

Diffusible Iodine Fluid.

Sometimes a substance about to be examined has become somewhat tainted already, and requires to be deodorized. For this purpose, the fluid called above diffusible iodine is useful. Its composition is :—

Iodine, 5 grains.

Amyl hydride (sp. gr. .620), 1 fluid ounce.

Let the iodine dissolve, close the bottle firmly, and keep in a cool place.

In using this solution, pour a little on the specimen and blow gently to evaporate the hydride. The iodine will be left in a state of fine subdivision, and will quickly deodorize.

Diffusible Bromine Solution.

Bromine, 5 minims.

Amyl hydride, 1 fluid ounce.

Let the bromine mix with the hydride, stop the bottle closely, and apply as above directed for the use of the iodine solution. This bromine solution is very effective, but is not quite so manageable as the iodine. It affects the breathing if inhaled as vapour.

Mem.—The last-named two solutions are applicable for many other purposes. They are splendid disinfectants as well as deodorizers, but they require to be used with care in the presence of a light, the vapour of the

amyl hydride being very inflammable. Amyl hydride is sometimes sold under the name of rhigolene.

Diffusible Benzoin Solution.

For the same class of specimens, I mean where there is a taint or odour of decomposition, it may be wished to use a deodorizer which yields an agreeable odour. For that purpose, the following answers we :—

Benzoic acid, 5 grains.

Alcohol (sp. gr. .880), 2 fluid drachms.

Amyl hydride (sp. gr. .620), 1 fluid ounce.

Let the acid dissolve, close the bottle carefully, and keep in a cool place. The solution is used in the same manner as with the two immediately preceding.

Benzoated Chloroform.

This solution was described in the last ASCLEPIAD. The composition is :—

Benzoic acid, 8 drachms.

Chloroform, 12 fluid ounces.

Let the benzoic acid dissolve in the chloroform. If there is any residue, filter, and the solution is ready for use. This is a most useful solution. It is good for deodorizing the hands after a post-mortem; for the temporary preservation of parts and organs; and even for the temporary preservation of the whole body, a little of it being spread or sprayed over the body to be preserved before enclosing in an air-tight shell or case.

Strong Iodine Deodorizing Solution.

In some cases a specimen is so thoroughly decomposed, it is quite impossible to examine it until it is deodorized. Such a specimen may be rendered free of

odour and firm, by being treated with the solution described below :—

Iodine, 5 grains.

Alcohol (sp. gr. .880), 1 ounce.

Sulphuric acid (strong), 5 minims.

Dissolve the iodine in the spirit, and add the acid slowly. This solution should be made fresh each time for use, and the specimen should be just covered with it and left in it for a few hours. The specimen will be rendered free of odour of putrefaction, firm, and preserved. Covered afterwards with spirit simply, it will lose much of its dark colour, and re-assume a very natural appearance.

Solution for Arsenical Washing (Tranehini's).

For a preservative arsenical solution, Tranehini's is most ready—

Arsenious acid, 8 grains.

Cinnabar, 1 grain.

Alcohol (sp. gr. .880), 1 fluid ounce.

Mix, and frequently agitate the solution. This solution is useful for preserving skins of animals. It has been used also for embalming.

Preserving and Bleaching Solution.

A specimen naturally white in structure may become changed of a dark colour and be decomposing. To preserve such a specimen, there is no solution so good as the following :—

Alcohol (sp. gr. .880), 10 fluid ounces.

Sulphurous acid to saturation.

Put the alcohol in a flask, surround the flask with ice water, and then pass *sulphurous acid gas*, made by the action of strong sulphuric acid on copper turnings, through the alcohol, until bubbles begin to escape

freely. After this, take away the gas and close the flask containing the saturated alcohol securely.

This is a most useful solution to have at hand. A very little of it, applied to a specimen, deodorises, bleaches, and preserves.

Corrosive Preserving Solution.

Mercury bichloride (corrosive sublimate), 10 grains.

Alcohol (sp. gr. .880), 1 fluid ounce.

Acid hydrochloric (sp. gr. 1.16), 10 minims.

This solution is useful for the preservation and hardening of delicate soft structures, such as the brain and spinal cord. The most perfect specimens of preserved brain I have ever seen have been preserved with this solution.

Glycerine Zinc Solution.

For preserving the brain in part or entire, or other nervous structures, the following also answers well :—

Methylated spirit, 20 fluid ounces.

Zinc chloride, 80 grains.

Glycerine, 10 fluid ounces.

Dissolve the zinc chloride in the spirit and gradually add the glycerine. In use immerse the structure in the solution, and keep it in until it is fully saturated. Then remove and let harden.

Pacini's Solutions for Minute Structures.

Professor Pacini employs the following solutions :—

	I.	II.	III.	IV.
Corrosive sublimate	1	1	1	1
Chloride of sodium	2	2	1	0
Distilled water	100	200	800	800
		V.	VI.	VII.
Corrosive sublimate		1	1	1
Acetic acid		1	8	5
Distilled water		800	800	800

	VIII.
Corrosive sublimate	1
Phosphoric acid	1
Distilled water	800

No. I. he uses for all vascular tissues of the human body, or of warm-blooded animals, such as pieces of a hyperæmic peritoneum, villi of the placenta, etc.

No. II. for the corresponding tissues of cold-blooded animals.

No. III. for cells, pus, infusoria, spores.

No. IV. is to be substituted for No. I. in all cases where the blood globules, which are so easily destroyed by chloride of sodium, are to be preserved intact.

No. V. is sometimes preferable to No. III., the acetic acid rendering the nuclei more distinct.

No. VI. is to be used for all fibrous tissues, muscles, and nerves.

No. VII. for glands; and

No. VIII. for cartilages.

CONCLUSION.

With these final memoranda I bring to a close this work on the science and art of embalming. I could have added some other, as yet fanciful, methods, but am content, for the moment, with supplying what is immediately practical, derived from many years of observation, and based on forty-eight actual enbalmments. By a careful perusal of the instructions given, every medical man may now carry out the details of the art himself with perfect confidence and success; a result which, I hope, will be useful to the younger members of my profession specially, whose interests I sincerely cherish.

OPUSCULA PRACTICA.

"There are mites in science as well as in charity."

BENJAMIN RUSH.

METHYLAL AS AN ANTISEPTIC.

THE fluid methylal which yields the vapour to the effects of which reference was made in ASCLEPIAD No. 18 was a chemical curiosity until I began to experiment with it in 1867, in order to test its value as an anæsthetic or destroyer of sensibility. It mixes readily with water, in the proportion of one part of itself to three of water. It is made by distilling together methylic alcohol and sulphuric acid in the presence of peroxide of manganese. The fluid is remarkable for its low boiling point, 115° Fahr. It passes into vapour at a low temperature, and, for that reason, soon envelopes any substance that may be enclosed in it, in a limited space, with a methylal atmosphere. It does more; the vapour being soluble in the water of the tissues, it acts after the manner of a salt, and permeates the whole of their structure. Diffused alone in contact with the red muscular fibre it preserves, but, at the same time, rather discolours the substance. It requires, consequently, to be diffused through

oxygen, or coke vapour, or coal gas, or carbonic oxide, if the colour of the substance preserved is to be retained.

Twelve specimens of animal structures, preserved in vapour of methylal, were sent by me on a test voyage to the West Indies, and twelve, preserved in a similar manner, were retained at home. The specimens consisted of six portions of lean of mutton and six of lean of beef, each one in a glass jar charged with coke vapour. The proportions of methylal were made alike in each series. One drachm of the fluid was put into a bottle containing beef, and the same into another bottle containing mutton; two drachms were put into two other bottles containing in one case beef, in another mutton. So through the series. The effect of different proportions of vapour yielded from one fluid drachm to six fluid drachms of the methylal was in this way tested.

The results were very uniform in the specimens sent abroad and in the specimens kept at home, the main difference being that in the specimens which went the voyage those submitted to six drachms of the vapour were found, on return, to have the stoppers in the bottles containing them loosened from expansion of the vapour. They had been surcharged. All the specimens in both series were free of putrefactive change, except those in which a measure of one fluid drachm only had been employed. These were of good colour, but were slightly tainted.

Those specimens which had been treated with two or three fluid drachms of the methylal were best preserved. They retained their colour and were quite untainted. Those subjected to a higher charge yielded a considerable amount of red fluid,

as though the vapour, under pressure, had extracted a portion of water from the tissues, together with some colouring matter, which under contraction of the tissues had flowed out of them.

One specimen, a portion of beef, was preserved forty-six days, and it was really difficult to see any difference in it from the first day of its preservation. It was of natural colour, free of any taint of putrefaction, and retained its firmness.

Methylal is not poisonous, and it is very readily applicable as an antiseptic. The flesh of animals preserved by methylal, when it is cooked, is rather condensed, like salted meat, and possesses a slight flavour of the methylal.

If we could find a fluid which, possessing all the physical qualities of methylal, was quite tasteless and quite inodorous, we should have a fluid very near to perfection for preserving food.

Methylal possesses also some qualities which are of value to practical physicians and surgeons. It forms an excellent solvent for other antiseptics, and can be applied to foetid wounds and sores with the double advantage of being locally anæsthetic as well as antiseptic.

STANDARDS OF HEALTH AND VITALITY.

IT has often occurred to my mind as I have witnessed the various presages, stages, and terminations of that abstraction which men call disease to ask the question:—Is there such a thing as a definable standard of health and vitality? Does any man at any period of his life ever

stand in such a position that he can say of himself, I am at this moment in perfect health ?

The conclusion I have arrived at on this question is that there is never in any man such a position. However perfectly he may be attuned, however orderly his natural organic functions may be, there is at each moment so much variety of external circumstance telling against the organic mechanism, so much of variation of external atmospheric pressure, of external temperature, of external chemical reaction, of external vibration communicated through the senses, and of all these external causes acting on the body and the mind, that perfect balance of function, perfect tension, can never be sustained. The musician sets his stringed instrument to the most perfect tune. How many seconds does it remain so set ? He plays upon it, and the activity disarranges the setting ; he lets it rest, but the rest is no protection, for when he picks it up again it must be reset, must be fed with new energy from him, and be re-adjusted. Man is a finer instrument than any instrument any man has made ; his nerves vibrate more tenderly than the most refined musical string, vibrate to minute impressions in waves, longer, shorter, infinitely more refined and complicate, and infinitely more difficult to keep attuned. In addition to these external variations to which the living man is subject, there is to be added the ever-constant action of the earth and the mechanical friction to which through the earth he is always being subjected. "To dust thou shalt return" is the ever-declaring voice of the earth. And yet there is this peculiarity about man : that the life with which he is endowed, dependent as it is on external circumstances, is so ordained that it possesses, if I may so express myself,

an independent position in respect to the body that is endowed with it. In certain bodies it is exhibited in living duration beyond what it is in others. There are bodies of a long and bodies of a short vital range. In families of the ower creation—in birds, for instance—we also see this rule. A parrot shall live to a hundred years; a pigeon shall live to the extremest range of pigeon life, and die at the end of twenty-five years. Yet the physiology of both these animals shall be practically, according to our estimate, the same.

And what is more to the point, whether we consider the family of the higher or of the lower animal, the duration of the life in both cases shall stand independent of external conditions, and it would even seem of recognizable organic animal conditions.

This quality of strong vitality, as it may be fairly designated, is shown not necessarily in immediate resistance to acute diseases or accidents, but in continuance of life even after such occurrences, and in opposition to the certain decline of life common to those who are less favoured with the capacity for continuing to live. The favoured few may, consequently, suffer from acute diseases as severely as their less favoured comrades, and may die as easily from acute disease; but let them recover or let them avoid accident or disease, and they will live their full term.

Various speculations have been made on the cause of this difference of range of vital power. By some it has been assumed that certain persons are super-endowed with a principle of life. Others have assumed that the partakers of longevity are visited less roughly with accidents of disease, or that they resist such accidents with more effect. Both these views are

apart from evidence based on fact. It is far more in accordance both with fact and reason to assume that those who live long are born with a very perfect balance of build of body, that the organs of the body are nicely proportioned the one to the other, that the organs of the pure vegetative life specially are of good mechanical construction and adaptation, and that the general harmony is equally maintained.

Two evidences are striking, if not absolutely convincing, on this point. One is that those born for the exceptional longevity, of which I am speaking, when they die in old age, according to the natural course, die altogether, die, if I may use the term, in mass; while those who have no such birthright of longevity die by premature failure of some particular organ, such as the lung, heart, liver, kidney, brain.

The other evidence is that the hereditary longevity depends upon the transmission of perfection of quality of body, just as personal beauty or personal strength is transmitted, or any other recognizable physical quality that marks a family or a race.

TRAINING FOR FUTURE GENERATIONS.

IF we cannot establish a perfect standard of health, we can nevertheless lay foundations for such a standard,—ay! of the highest and the noblest. The knowledge of this fact is the greatest of all consolations for those who labour in this day without any hope of living to see their best results in days to come. We have, moreover, realized something hoped for, which though it be something partial, is yet a direct result of what we have done,

for we have seen death-rates decreasing under our skill, a first instalment of the greater triumphs that are to follow. In the work we, as sanitarians, have performed, we have laid the train and started the training. And, after all, training is everything. Our forefathers trained for short life, and succeeded in the most remarkable degree. We have commenced to train for long life, and we are succeeding in our way quite as completely as they in theirs. They, without intending it, trained for disease; we, fully intending it, train for health, health that is pure, progressive, and persistent. Our labours in this direction cannot be too manifold, too earnest, too continuous, for in them, if they prove successful, we ensure benefits extending beyond ourselves, our own lives, our own generation. There is not the minutest victory which we can win in our conflict with disease and death that is not stamped for ever on the revolving life that has to be made manifest through future organic forms. The vitality changes not, but the form it animates so changes, through the development it undergoes, that it is influenced throughout all the organic domain. To us it is not given to supplement vitality, whatever we do, for vitality in its essence is not under our command. But to us is given the whole possession of the organism by which the vitality is made manifest, and in which it is potential. We see each organism reproducible after its kind; moulded to carry life on to a fixed duration, long or short according to the productive sample on which it is based. This sample we can debase or improve. When, therefore, we improve the sample we improve the product of the sample, and our work becomes immortal in proportion as it reduces mortality.

HABITUAL INSOMNIA.

THOSE who are engaged in hazardous and speculative pursuits, and who get into the habit of irregular business life, and particularly into the habit of laying out plans and devices which shall be "sure to win," are almost always checked, comparatively early in their careers, by disturbances commencing in the circulation. Their earliest symptoms are, commonly, those of mental strain and irregular action of the heart, followed by results leading to habitual sleeplessness, insomnia generated by habit.

In persons of vigorous constitution the habit of disregarding proper sleep, and the insomnia which springs from it, may go on for several years without any apparent bad effect. In time, however, it is certain to produce its natural consequences. The first indications of danger are irritability of mind and feverish excitement, followed by depression, pallor, and deficiency of appetite. These are succeeded by fits of unconsciousness, in which the affected person positively sleeps, and, it may be, sleeps soundly, without himself knowing the fact. In this way he gets rest, which for a little while may give a certain measure of relief; but soon the nervous failure increases, and one of two results succeeds. He either falls into a sleep which becomes a coma terminating in death, or he continues sleepless, unless artificially made to sleep by narcotics, and with progressing failure of power sinks into paralysis, to succumb from that affection.

In exceptional cases the insomniac makes a fair

recovery. Under regulated mode of life, and especially under the regulation which leads the sufferer to go to bed at unusually early hours, such as eight or nine o'clock, whether he can sleep or not at first, habitual insomnia or sleeplessness may be cured without any artificial aid. It is, however, apt to return after mental strain or worry, and indeed may be expected always to return if the strain or worry be severe or prolonged.

NAUSEA FROM MOVEMENT OF THE BODY IN ROTATION.

WHEN a rapid circular motion of the body should lead to the sensation of nausea, or even to vomiting, is one of those simple but as yet unsolved problems in medicine which has for many ages remained to trouble the mind. The most extreme example of injury from the cause named I have ever met with was in a young man who was subjected to a railway accident. He was a letter-sorter in the mail van. He was engaged at his work when the train came into violent collision, and was thrown off the line. The mail carriage was not overturned, but the floor of it was broken to pieces, and the young man, in order to save himself, seized a cord that was attached to the roof of the carriage, and suspended himself by it firmly. He commenced at once to swing rapidly round, to use his own description, "like a leg of mutton turned by a jack," and so he continued to swing and turn until the carriage stopped. The motion lasted, he believes, from five to seven minutes, but as, after a time, he, to some extent, lost his consciousness, he was not very certain as to time.

The sensations experienced by this patient at the time

were, at first, those of excitement rather than depression; but soon he began to feel "an awful sensation in the stomach, as if he must vomit but couldn't," and this was succeeded by a feeling of faintness, so that he held to the cord with extreme difficulty. He did not remember who came to his relief, nor how he was put to bed; he could only remember that he seemed to "wake up heart-sick," and trying to vomit, but with little effect. He was still, according to his own sensations, turning round, and this symptom remained on him for many weeks.

His visit to me was two months after the accident, but the efforts to vomit were still present. He could take very little food, was much emaciated, and had no power of going to sleep. So soon as he tried to sleep, and was on the point of "going off," the sensation of circular motion returned, with violent retching.

Previously to consultation with me, the practitioner who had had charge of the patient had exhausted the therapeutical treasury of sedatives without avail. I recommended cold spinal douches, firm bandaging of the stomach, and farinaceous food of the lightest kind. To obtain sleep for the man I recommended that he should go to bed in a rocking chair, and that he should be rocked gently, so as to stop the abrupt cessation of motion incident to sleep, which clearly exaggerated the symptoms that were most distressing. I had the satisfaction of hearing that these methods of treatment were attended with so much relief, that in a few months a fair recovery resulted, but that a very slight diversion from a rigid method of living brought on the stomachic derangement again, with giddiness and depression of mind.

I have sometimes questioned dancers, and those

performers who make rapid circular movements of the body, if they suffer from nausea as an effect of their efforts. The answer usually given is, that "they do if they keep up the movement too long in one direction, but that the change round about removes the sensation." It is as if they twisted some thread of life by one movement and untwisted it by the other. The phenomenon of course was known to Shakspeare—

"Turn giddy and be helped by backward turning."

And a very curious phenomenon it is, one well worthy of close study, as bearing on sea-sickness and many other obscure nervous vagaries.



EXTRA SOLICITUDE FOR THE SICK.

HHE physician should of all men be a man of humane bearing and disposition. He should remember at all times and seasons that a sick person is one who, whatever may be his natural strength of mind in health, is, when labouring under disease, enfeebled of mind, either excited or depressed. Moreover, he should remember that some diseases that are in themselves comparatively trifling and devoid of danger are still sources of great mental trouble and perturbation. This fact was noticed at some length in a previous number of the *ASCLEPIAD*, in the article on "The Mind as a Diagnostic Surface." It is a point of great practical moment, the lesson from it being that the physician should ever be most considerate in his ministration; and, that looking upon his patient as one whose mind is not so strong and calm as its accustomed wont, should accept

every act, though it even be painful to himself, with charity and peaceful dignity. It was the faculty of carrying himself in this wise that made the late Sir Thomas Watson so admirable a physician,—admirable in all qualities, but especially in manner and word. There is, however, another side to the medical character which requires to be equally cultivated. The physician should avoid all extra-solicitude. If I were a patient, I do not think there is anything in nature that would annoy me so much as to hear a medical man expressing unnecessary or extra precaution and anxiety for my welfare. Unless I knew him exceedingly well, I should not be inclined to believe him, in the first instance; and if I did know him, and were convinced of his sincerity, I fear it would too often be necessary for me to look upon him as a man of nervous nature who was not always ready or equal for an emergency. My own feeling in this matter is, I am sure, not at all exceptional, and I would strongly recommend every young aspirant to medical fame to learn from the first to be solicitous without making the solicitude specially conspicuous. It is good practice in the direction here indicated to be careful never to convey to a sick person who is in danger any urgent intimation of danger. It may be necessary to communicate the truth, but even that cannot be communicated with too much caution, or with too much of reasonable hope. One practitioner I knew very well would be so imprudent as to tell his patients that they “looked pale.” “If I didn’t I shouldn’t have sent for you” was once the sharp and well-deserved reply. But on another occasion when, from habit, he made the same remark to a woman who was fainting from loss of blood and fear combined, he just consummated the syncope.

Of course this was an extreme blunder, for no one who reflected on the effect would report pallor of the face to a fainting person. But it is a strong illustration of how far a bad habit may lead a practitioner, usually prudent in other respects, into serious error, for which reason I leave it as a remembrance to the novitiate in the field of practice.

VERTIGO FROM CONSTIPATION.

PERSONS who are accustomed to have a regular action of the bowels every morning are usually affected with giddiness or vertigo, or with a sense of faintness, if the natural habit be, by any accident, omitted. The reason is a very simple one, and is purely mechanical. The regular habit causes the rectum to be loaded with fæces, and when the rectum is loaded there is pressure on the surrounding veins. But, as I have shown by direct experiment, the cerebro-spinal fluid finds its way into the venous circulation by the inferior vena cava and the common iliac veins. When, therefore, there is pressure, causing impediment to the venous circulation in the pelvis, there is at once an interference with the process of escape of the cerebro-spinal fluid, and pressure upon the whole of the cord, up to the cerebrum itself.

The form of constipation here referred to is in the rectum, and must not be confounded with constipation due to accumulation or inaction in the colon. Vertigo with constipation, and with the patient connecting the uneasy cerebral symptoms with the constipation, is an indication that the rectum is loaded, and that relief will follow from a brisk aloetic purge.



William Hunter.

1731-1793. 1731-1793.

1731-1793. 1731-1793.

[illegible]



Samuel Johnson

WILLIAM HUNTER, M.D., F.R.S., F.S.A.

ABOUT one hundred and thirty years ago there might be seen driving through the fashionable parts of London in a plain and, to the modern taste, cumbersome chariot, a light, spare, short man, whom many persons know and whom all recognize with respect. The features of the man are of Scottish cast, but pleasant and winning. There is an intelligence in the face which bespeaks acuteness rather than power, and caution rather than courage. The external of the man is perfect for the time. The head is surmounted with a wig, unpretentious in size, and well suited to the features beneath. The body is clothed in a dark suit, with coat and waistcoat collarless, and shirt-front gently protruding from vest in elegant frill. The chariot starts from the door of a house in Jermyn Street, and, much earlier in the morning than is fashionable now, bears its owner through the great squares and streets, near St. James's and Pall Mall, on medical professional rounds. Whenever the chariot stops the occupant alights, and with quick firm steps proceeds with the work before him. His patients, as they receive him, listen with much attention to his careful teaching; and, professional matters over, get a hasty chat with him on general topics. It is a pleasant moment passed in this

way, for the man is not a mere hack, bound hand and foot to the Esculapian shaft, but a gentleman and a scholar. He can talk about everything, and knows all that is going on. The antiquary brings him an ancient coin, and finds a colleague who can discuss the points of date and of value. The naturalist shows him a fossil bone, and straightway the two are at home and comfortable. The historian discourses with him as a brother; and with the classic he crosses excellent Latin. With the ladies his conversation is charming, for his voice is musical, his expression faultless, and his manner gallant. With them he has but one blemish, and even that may be curable: he is a bachelor, and pretends, with all his vivacity, to invincibility against female charms. The sick visits are concluded, but the chariot still wends its way, until at last it stops in Covent Garden, where the scene changes. There is held at this time in Covent Garden a society or lecture-place, in which young men who are about to seek their fortunes in the Naval Medical Service meet to train themselves to the duties before them. They take their seats on the benches, the carefully-dissected subject is placed on the lecture table, and the active little personage who has attended us so far enters the room and takes the professorial position. There is a suppressed but hearty cheer; and then the lecturer, the natural manuscript, only, before him, commences his lesson. The eloquence, the precision, the force, hold back an applause which is ready at any moment to pour forth, and when the last words are uttered does pour forth in free course. The lecturer smilingly retires, the students stop behind to talk in admiration of their teacher; and the teacher himself, but little wearied, glides again softly to the chariot. He will call at Middlesex Hospital perchance, or at the British Lying-in

Institution, to perform his public duties there, and then he will return to Jermyn Street to dine with his friends. If you are invited to the dinner, you will find everything about the house substantial and in taste, but plain withal and inexpensive. Whatever may be the host's income, it is clear that he does not expend it on externals. The dinner, too, is a pure feast of reason. You may meet Fothergill, and young Hewson, and Watson, and one or two of the literary men of the day, and you may be entertained at a mental banquet; but the poor body will feel no inspiration from a feast. At most you will see but two dishes; and your host, before grace, will tell you that he makes no apologies, for in his opinion "a man who cannot dine on one dish deserves no dinner." When the table is cleared the servant will go round and give you one glass of wine—not a drop more, though you may sigh as if you would die for it. The conversation will turn on various subjects, and your host will take the lead. He will recount his late visit to Leyden, and his interview with Albinus. He will attack Edinburgh Munro fiercely, for he is grand at invective, or describe some new dissection on which he is engaged. You may hear something of Brother John, who, in indifferent health, is away on a sea-going trip, but who is constantly sending some specimen to Jermyn Street, to announce the fact of life. You may hear too of political rumours, and suggestions as to the results of the court-martial held on the noble Sackville; but town scandal there will be none, nor much mirth. Tobacco—fie!—who dare smoke in such company?

The conversation flagging, or the time becoming unruly, you will leave the table and be led to the museum. Here the active little man brightens up anew,

and, heeding you little as visitors, puts on his work dress and begins to prepare and arrange such specimens as are in disorder. He apologizes for the museum. It is in fact but a nucleus; some day he hopes to make it wonderful, to build a great temple of curiosities, and leave all to his country. He will make the Premier an offer, which even a Premier cannot refuse. Then old Calderwood, the village in which he was nurtured, will look up and be a place of mark for ever. You leave the philosopher for the night; but he remains at his work, or, as he calls it, his play. Long after you are in bed he is still at play, injecting lymphatics, or fitting up specimens in spirit bottles. Unless you get up with the sun, too, your friend will be up before you and again at play. At nine you call to leave your card—manners in the last century must be sustained rigidly—and find the chariot at the door, and the little man, as is his wont, spruce and trim, bright, pleasant and intelligent, ready to get into it once more; indeed, his foot is on the step, and he is in haste, for there are a great many demands in the morning on the services of Dr. William Hunter.

William Hunter, at the time I have depicted him, was the rising London Accoucheur, and if getting into good practice is to be considered as fame, he was now approaching the zenith of his fame. He was little over forty years of age, hale in mind as body, full of enthusiasm, and ambitious in the right way. With the centre-point of his life before us, we may take sight of him in two directions—towards his cradle and towards his grave. There is not much historical matter before us for biographical display, but such as exists is trustworthy, and had better be at once acknowledged, since it is half the battle in writing well to write with a clear

conscience. Men who steal always go on tiptoe, and that style is not easy. There was, then, one Dr. Samuel Foart Simmons, who, directly after Hunter's death, wrote a memoir of him, which he read to the Society of Physicians on August 6th, 1783. This memoir is as rugged as a pineapple, and much more shapeless; but it has the credit of substantiality, and stands, like the apple, on a broad bottom. In collecting his material, Simmons had the assistance of John Hunter; of Combe, who attended William Hunter to the last; of his relative Mrs. Baillie; and of many other friends: and from this memoir every other biographer has taken his cue.* I cull largely from Simmons, with fullest recognition.

BIRTH AND EARLY LIFE.

William Hunter was born at Long Calderwood, Kilbride, on May 23rd, 1718. There seems, in regard to this Hunter, no doubt as to the date of birth. He was one of seven sons of his parents, and at the time of his birth their second son. Some years before they had had a first son "John," but he died early, to make way for a second John, the first in fame of his family. There was also another brother, James, who, starting as a writer to the signet in Edinburgh, at last took to medicine, and showed great proficiency; but died of lung disease before he had time to become eminent.

William at the age of fourteen went to Glasgow, and studied five years at the University there, with the intention of entering the Church. But when his studies were completed, he declined the mission before him, on conscientious grounds. He could not

* In one biographical work, Simmons' memoir is cribbed word for word, with mention of his name once only, and that not in acknowledgment.

subscribe the dogmatical articles of the faith. He was not the first good man who has been driven to Physic by the same cause, for which Physic may thank the Church. His parents, who were poor, and who had spent as much as they were able to prepare him for the pulpit, were disappointed, but prudently gave way to his scruples. In his hesitation what next to do, he became, in some way, acquainted with Dr. Cullen, then in practice at Hamilton, and Dr. Cullen advised him to follow Medicine. He took the advice, and in 1737 he went to reside with Cullen, and lived with him some years. During this residence master and pupil became as one, and in all his life Hunter retained in his remembrance this happy and congenial period. So intimate, indeed, became the friendship, that at last it was agreed that the pupil should have a share in the practice of the master, and should undertake the Surgical department. In November 1740, therefore, Hunter repaired to Edinburgh, to prepare for this responsibility, and remained pursuing his studies until the spring. During the session he attended the anatomy of Dr. Alexander Monro. In the summer of the same year he entered London to complete his studies, with the object after this of rejoining Dr. Cullen. The return was not made; and it is fair to say that when the master found that the return would spoil the prospects of his disciple, he at once generously excused him the agreement.

On his entrance into the English metropolis, Hunter took up his residence with Smellie, of obstetric fame, who then resided in Pall Mall. The connection was fortunate for our scholar; but he was yet more fortunate in having a letter of introduction to Dr. James Douglas, from Foulis, a Glasgow printer, to whom Douglas was under some kind of obligation. Douglas was originally

from Scotland, and was, in his time, a man of considerable note. It was unfortunate that he had a Quixotic brother (John Douglas), who made himself notorious by attacking Cheselden anonymously. The freaks of John Douglas were often attributed to James, but in so far as can be gathered, very erroneously. James Douglas was a man of deserved repute, and good-hearted. He had originally adopted anatomy as his calling, but afterwards followed midwifery, a practice just then coming into existence among male practitioners. He was evidently well to do, and at the time when William Hunter came before him he wished for an assistant, and soon fixed upon William as the man to select. He therefore made an offer to that effect, which was gladly accepted, after some temporary obstacles were removed out of the way. To bind himself to London life was for Hunter to break faith with Cullen, and to disappoint parental expectations. Hunter, therefore, wrote to Scotland for liberation from his previous contract, Cullen, as we have seen, gave up his claim, and old Mr. Hunter,—who, by the way, died three months afterwards—in a very sensible and homely letter, gave a negative assent. William Hunter consequently went to reside with Dr. Douglas, and remained with him till his death on April 1, 1742.

Whilst living with Dr. Douglas, and working with him, William Hunter entered as a pupil at St. George's Hospital. Here he studied Surgery under Mr. James Wilkie. During the same period he also studied Anatomy under Dr. Frank Nicholls, and Natural Philosophy under Dr. Desaguliers, a famous mathematician and physical philosopher, who ultimately became chaplain to the Prince Frederick. After the death of Dr. Douglas, Hunter continued still to reside with the Douglas family, and we may infer that he ultimately

obtained a considerable introduction to practice by this means, and that his connection with Douglas led him to the line of practice to which he afterwards linked himself, the practice of the accoucheur. Meanwhile, he undertook the supervision of the studies of Mr. James Douglas, the son of his late friend.

The first evidence we receive of the originality of mind which in later life showed itself so well in William Hunter, is in 1743, when he presented to the Royal Society a paper on the structure and diseases of articulating cartilages. At that time medical societies were limited in number, and all matters of scientific interest, medical and general, were sent to the "Royal." The paper of Hunter was, consequently, sent there and read. But it did not immediately secure him his Fellowship, though, if I remember rightly, it was awarded a niche in the *Transactions*. Hunter, having thus made an entrance into public life, was anxious to do more, and his bent was next to teach anatomy. There were immense difficulties in that day to a position the attainment of which is now comparatively easy. But at last the difficulties gave way, and his object was secured. Samuel Sharpe, the Lawrence of his day, had for some time lectured in Covent Garden to a class of students who were preparing themselves for the naval service. About 1746, Sharpe, who had said his say, gave up his teaching duties. Hunter succeeded him, and his first course was very satisfactory; his second still better. Walking home after his second introductory lecture, he carried under his arm a bag containing seventy guineas, and his joy was great. Watson, a pupil and after friend, accompanied Hunter on this occasion, and was told by the delighted lecturer that so large a sum had never

been held before by the owner, for first fees are always sweetest, and nothing, as the winner thinks, shows the triumph of effort so clearly as filthy lucre. When Hunter resigned this Lectureship is not very evident ; but he held it a long time, and made it a basis of sound success. I have already shown that his labours here were warmly appreciated, and that he was not merely a sound, but a brilliant, teacher.

In 1747 Hunter became a member of the Incorporation of Surgeons, and at the close of his lectures in this year he took a continental trip with his pupil, Mr. James Douglas. They visited Paris and Leyden among other places, and at Leyden made their bow to the eminent Albinus, who showed them his collection of prepared specimens, and impressed on them a permanent recollection of his industry and genius. Returning to London and to work, Hunter now made rapid way in practice. He was elected Surgeon-Accoucheur to Middlesex Hospital in 1748, and to the British Lying-in Institution in 1749. In 1750, having graduated at Glasgow, he left the Douglas family, took a house to himself in Jermyn Street, and was fairly out on the professional sea, captain of his own vessel, and utilizing every favourable gale.

William Hunter, while thus carving his own way to fame, was helping two others in the same direction. James Hunter, the elder brother, originally intended for the law, had left Edinburgh to study anatomy in London. William had set him to work, and had viewed the work done with a brother's and a teacher's satisfaction. But poor James was not destined for distinction : he was seized with spitting of blood, returned to old Calderwood for native air—and died. There was yet another brother, much younger,

John ; and John, after sowing a few preliminary wild oats, wrote to William, begging to be inducted by him into the medical fraternity. William said " Yes " to the request ; and a few days previous to the eventful 1st of October, 1748, the man who was re-buried with so much pomp in Westminster Abbey thirty years ago rode into London on horseback after a fortnight's journey.

All writers seem agreed in stating that William Hunter did not at first over-estimate the abilities of his brother John. This want of estimate was, however, due to deficient knowledge, and to reports that had been made relative to the wild oats aforementioned. John soon undeceived his brother in respect, at least, to talent. He was set to dissection, and at once showed his proficiency. Still John had more oats to sow, and he sowed them. Ambitious in frolic as in science, John, under the title of " Jack Hunter," took the lead in many a wild game : made friends with the resurrection men ; visited the sphere of the gods in the theatres to hoot down unfortunate authors and players ; and altogether kept up for a long time the principle of " a short life and a merry one " as *the thing*. By-and-bye he sobered down to regular work and pursuit of true fame, and became a right hand to his brother in the anatomical duties. The alliance between the two brothers continued for ten years, John Hunter, six years after the commencement of his studies, becoming a partner in the anatomical school. At the end of the ten years John's failing health led him away from this country for six years, and on his return he went into practice on his own account.

In 1751, Dr. Hunter paid a visit to his mother at Long Calderwood. It was their last interview, for Mrs.

Hunter died on the 3rd of November of the same year. Cullen had by this time gone to reside in Glasgow, and the meeting of the two old friends was most enthusiastic. One day, riding near Long Calderwood, Cullen observed how conspicuous the place stood out in the landscape. "Well," said Hunter, "if I live I shall make it more conspicuous." It is probable that Hunter never again revisited his native village. His work in London held him securely for the rest of his life.*

THE ORIGINAL WORKER.

From this period till the period when we first became acquainted with Dr. Hunter, *i.e.*, from 1751 to 1758-9, many events of moment, especially in a scientific point of view, occurred. In 1755 he had been made an acting physician to the British Lying-in Hospital, with "the thanks of the Governors for the services he had done the hospital, and for his continuing in it as one of the Physicians." In

* Advertisement from the *London Evening Post*, January 12th, 1748.

*On Monday the 1st of February, at Five in the
Afternoon,*

WILL BEGIN

A COURSE of ANATOMICAL LECTURES. To which will be added, the Operations of SURGERY, with the Application of BANDAGES,

BY WILLIAM HUNTER, SURGEON.

Gentlemen may have an Opportunity of learning the Art of Dissecting, during the whole Winter Season, in the same Manner as at Paris.

Printed Proposals to be deliver'd at Mr. Millar's, Bookfeller, opposite to the End of Katherine-Street in the Strand.

The same paper contains announcement of the publication of Roderick Random, and of Hogarth's Two Apprentices. Many years ago I was indebted to my learned friend Mr. Charles Hawkins for a loan of this paper.

1756 (Sept. 30) he had become a Licentiate of the Royal College of Physicians, and a member of the Society of Physicians. He had taught in his class many subjects which, ranking as discoveries, gave rise a little later to violent controversies. He had described aneurismal tumours more carefully than any previous author, and had pointed out the nature of aneurismal varix. He had explained with much care and precision the structure of cellular tissue. He had written an account of the ovarian dropsy, and many questions relating to it,—whether or not it should be treated by incision and suppuration, or by complete excision. He had virtually discovered the disease known as retroversion of the uterus. He had introduced bristles into the ducts of the lachrymal gland. He had made out, and taught publicly, the origin and uses of the lymphatic vessels; he had injected the tubuli testis with mercury. He had supported the theory of Haller as to the insensibility of tendons; and, aided by his brother John, he had made experiments relating to absorption by the veins.

Among all these labours, that of most interest was the one referring to the lymphatic vessels. Previous to Dr. Hunter's time, the theory held by anatomists was that the lymphatics were veins, and that they were the continuations of lymphatic arteries. He claimed to be the first man who demonstrated that the lymphatics have an independent origin, and perform what has been designated "interstitial absorption." He was led to this view by the observation that the lymphatics could not be injected from the arteries, and by a comparison of the lymphatic with the lacteal system. He concluded that there was no virtual difference between these two systems, and that

the lacteals were in fact the lymphatics of the intestinal canal.

Arrived now at the period at which we first saw Hunter, as he appeared at the zenith of his life and of his fame, let us follow him onwards to the end. In 1762 he was called, in consultation, to the Queen, who was then *enceinte*. His work being now more than he could perform single-handed, and his brothers being away, he needed assistance, and engaged his pupil, the distinguished Hewson, to take part in his labours. Hewson, so well known to us through the pen of his learned and philosophical biographer the late George Gulliver, was a man in every way suited to the tasks required. He was an excellent anatomist, an ingenious experimentalist, and of gentle and engaging manners; and, he soon rose from the position of an assistant to a partnership in the anatomical department.

In this year (1762) Hunter commenced the publication of his "Commentaries," in which he entered into a controversy with Professor Monro as to the discovery of the origin of the lymphatic vessels, the injection of the testicle with mercury, and venous absorption. He also defended himself from a reproach which had been cast on him by Monro, senior, regarding a dispute which had arisen between himself and Pott in relation to congenital hernia. Pott replied to this, and Hunter again took up the defence, in a supplement to the first series of the "Commentaries." It is clear on perusing these sallies that the credit which Hunter most desired to secure for himself had reference to the discovery of the origin of the lymphatic vessels. Following Dr. Simmons's statement, which seems to be very fairly and clearly set forth, it would seem that Hunter proclaimed his discovery of the origin of the lymphatic

vessels so early as 1746, while Monro, who made similar observations, did not put his views before the world until the year 1755. As regards Monro, therefore, Hunter has an undoubted priority of claim. But Simmons very properly points out that neither claimant had strict right to the discovery, inasmuch as M. Noguez, a French anatomist, in the second edition of a work entitled, "*L'Anatomie du Corps de l'homme en abrégé*," published in 1726, described the independent origin of the lymphatic vessels, and their absorbent use. Hunter's description was given, however, independently, and with more clearness.

THE FOUNDER OF A MUSEUM.

About the time to which I now refer Hunter was contemplating a design which has added substantiality to his fame, and a monument worthier than any that may be raised to him. His circumstances becoming good, he determined first to acquire such a competency as should make him comfortable in his later life, and having achieved this, to found some institution which should be at once his and his country's pride. It occurred to him that the foundation of an anatomical school in London was a desideratum; and with this object before him, he presented to the Minister Grenville, in 1765, a memorial requesting the gift of a piece of ground in the "Mews" for the site of an anatomical theatre. In return for this small grant, he undertook himself to expend seven thousand pounds on the building, and to endow a professorship of Anatomy in perpetuity. Unfortunately, the noble and yet modest request was not complied with, and the scheme as a national project was set aside. Looking back at all

the struggles which teachers of Anatomy have endured since Hunter's time, the misfortune of this failure is seen in all its fulness. Had the scheme been followed, there might at this time have existed in London an Academy of Medicine second to none in the world, and the name of Grenville might have stood, in perpetuity, coequal with that of Hunter. But it is the misery of great politicians to be content with present greatness, to look down with princely smiles on all enthusiasts who live in the future, and, worse than all, even to ignore science, as something apart from any ministerial project. Shall we blame Grenville the Minister? No! He knew no better, and so it were wisest rather to pity the Minister than criticize the man. The Grenvilles are a race well stocked. We have them now grand and blind as heretofore. Make a similar offer, deluded enthusiast in science of to-day, and where is your Minister that will not smile and decline as Grenville did? A one-minded race these Ministers, bound to the generation in which they are born; princes in it, and infinitesimal dust, corporeal and mental, out of it.

Not long after the time when Hunter laid his modest memorial before the Minister, he had a conversation with the Earl of Shelburne on the subject of the school. The Earl approved, but thought the scheme should be carried out by means of a subscription, and requested to have his name set down for a thousand guineas. Generous as an offer, thought William Hunter, but not in taste. At any rate, he, William, would have nothing to do with it. If anything were to be done, he would do it himself; so he bought a piece of ground in Great Windmill Street, where he built a spacious house, a good anatomical theatre, and one grand room for a museum. This building remained standing until about

two years ago, when it was destroyed during improvements carried out by the Metropolitan Board of Works.

In 1765 Dr. Hunter was appointed Physician Extraordinary to Her Majesty, and in 1767 he was elected a Fellow of the Royal Society. His brother John was now again in London, and was becoming a great man on his own account. The brothers, indeed, did not enter again into alliance after John's return, and it is not certain that they were on the most intimate terms. In some respects John was at this time ahead of William in fame, and even received the F.R.S. a short time first.

After his election to the Royal Society, Dr. Hunter sent to the Society a paper on some bones which had been found near the river Ohio in America, and which were supposed to be the bones of an elephant. Hunter came to the conclusion that the bones were not those of an animal identical with the elephant met with in Asia and Africa. The question thus opened was one of immense general interest at the time; for a point was then under consideration which has since and lately been before the public, viz., whether animals change and adapt themselves to climate, or whether in the history of our planet such great revolutions have occurred that parts which are now cold and uninhabitable have once been warm and fruitful. In the same year he also described, at the Royal, an Indian animal called the Nyl-Ghau. In the next year he was elected a Fellow of the Society of Antiquaries, and first Professor of Anatomy in the Royal Academy. The latter appointment was made by the King, and the manner in which the duties were performed showed at once that an Anatomist may be a chief of artists though he never touch the pencil.

The partnership entered into between Hunter and Hewson continued for many years without interruption; but in 1770 some disputes arose, and the partnership was dissolved. If I may offer an opinion, I should say that the disputes were due mainly to Hunter himself, who being, with all his good qualities, opposed to rivalry, got jealous of his friend. On breaking partnership with Hunter, Hewson entered into a new partnership of a more pleasant kind, *i.e.*, he married a very amiable lady. But he did not live long; four years later, poor man! he threw off the shackles, his last moments embittered by the thought that he was leaving a wife and three children to the mercy of the world.

Cruikshank succeeded Hewson in the Hunterian school, and continued in office to the end. Hunter himself was by this time somewhat worse for wear; he was plagued with fits of gout, and became in 1772-3 so unwell that he had serious thoughts of retiring from practice. Cullen and Baillie, indeed, went to work to find out an estate where he might settle down and rest in peace. They found a suitable spot near Alloa, in Scotland, bid for it, and, as it was believed, purchased it. But the title-deeds being defective, the purchase was never completed, and the design of retirement was altogether abandoned. The museum, the anatomical teaching, and practice, filled up now the whole of Hunter's time, so that literature owes less to him than it otherwise might have done. But his pen was not altogether idle, and when it worked it worked in earnest. In 1775 he forwarded a paper to the Royal Society on the Venereal Disease. The essay was historical. Those who are conversant with Astruc's great work on the Venereal Disease will remember that this author traces the introduction of the disease into Europe from

the date of the first voyage of Columbus. His argument runs that the disease was endemic in Hispaniola, and on parts of the American continent, that it was communicated to the men who attended Columbus by the Indian women, and brought by these men to Europe; was propagated by them, first to the Neapolitans, thence to the French, and from all three to the other European nations. The evidence on which this argument is founded is taken mainly from the statements of Gon-salvo Ferdinand ab Oviedo, who, being at the court of Spain in 1493, when Christopher Columbus returned from his first immortal voyage, was sent by King Ferdinand to Hispaniola in 1513 to inspect the melting of gold there; and who, living in the West Indies twelve years, and retiring to Toledo in 1525, wrote, at the request of Charles V. of Spain, a "Summary of the Natural and General History of the West Indies," in which he assumes that the venereal disease was imported from the newly discovered islands into Spain. Hunter supported the idea that the venereal disease had existed in Europe before Columbus sailed from Palos; he adduced as his testimony the writings of Peter Martyr, a friend of Columbus, author of the "Discovery of America," and writer of letters on the subject of the disease to Arias Luritanas of Salamanca in 1489; but he did not publish this paper, some doubts having arisen in his mind as to the correctness of the dates of the letters of Peter Martyr.

MAGNUM OPUS.

In 1778 Hunter rendered a memorable service to medical science by the publication of his immortal treatise on the gravid uterus. It is almost impossible

to compute, in the present day, the influence of this book. For patient research it is a model of excellence. Harvey spent eight years in investigating the phenomena of the circulation. William Hunter spent thirty years in investigating the facts connected with the uterus during the period of pregnancy. We read the work now with all the pleasure arising from the knowledge that the delineations are by and from the pure nature. In the preface due mention is made of the labours of brother John and the artist Strange. In the dedication a compliment is couched to the King. In the body of the work there are excellent plates, excellent readings, the record of the discovery of retroversion of the uterus, and the account of the existence of the *membrana decidua reflexa*. There was, perhaps, never a book published by any one physician on which longer and severer labour was bestowed.

Two years later he sent to the Royal Society an account of Dr. Mary's illness, the report of which is given in the *Transactions*; and in 1788 he communicated to the Society of Physicians an essay on the proposed operation of the division of the symphysis pubis in some cases of difficult parturition. He did not in this contribution directly oppose the operation, but claimed for it a fair trial; his mind was, however, convinced of its doubtful utility and its possible dangers.

A GREAT CONTROVERSY.

From the period of 1777 we meet with no incident of moment until 1780, when one of the most curious and painful of events occurred, viz., a literary battle between the two brothers, William and John Hunter. There

had long been an estrangement between them; and although in 1768, when John was a competitor for the office of Surgeon to St. George's Hospital, he succeeded, mainly through the interest of his brother, the breach was never thoroughly made up. In this year, 1780, John took a step which is as incomprehensible to the world of science now as it was then. He sent to the Royal Society a paper in which he claimed the credit of having first discovered the true mode of connexion between the uterus and the placenta. For twenty-five years all the merit of this discovery had been awarded to William, and John had held a silent tongue, had, in plain fact, by negation admitted his brother's originality. Now he put forward the following statement—that Dr. Mackenzie, having in 1755 injected a subject, and being unable in dissecting it to explain an appearance in regard to the placenta and uterus, he sent for him (John Hunter), who, examining the parts with more care, made the discovery of the true mode of connexion between the two structures. "In the evening of the same day," he continues, "full of the discovery, I came to Dr. Hunter, and brought with me Dr. Mackenzie, to see and judge of the explanation I had given and Dr. Mackenzie had agreed to." William Hunter, on his part, wrote that he had always recognized the labours of his brother John with pride, but that the discovery in question was unhesitatingly his own; that it was not a discovery arising from random conjecture, or lucky thought, or accidental occasion, but from a persevering pursuit of twelve or thirteen years at least, always publicly known, and admitting of the most circumstantial proof. Two angry letters to the Royal Society, which were not published, one from each brother, closed this controversy; but William

never withdrew his claim nor fully forgave, while John was made unhappy by the event his life throughout.

It is curious that there are no clear historical documents throwing light on the true nature of this transaction. Like the *Letters of Junius* and *The Man in the Iron Mask*, the event has given rise to much theorizing and noise. The only one who could have said something in point was Mackenzie, and Mackenzie is not on the field and is not to be heard: he was dead or silent. Taking all things into consideration, I am forced to the conclusion that the right in this matter rested with William Hunter. The discovery was not one, as William Hunter well observed, that could have occurred on "an accidental occasion;" it was a discovery requiring, as all such discoveries do require, years of research and repeated observation. That in John Hunter's story there is a nucleus of truth, we can conceive. It may be that he, John Hunter, together with Dr. Mackenzie, did at one time show an injected specimen to William Hunter as exhibiting peculiarities which admitted of being explained in a certain way, and that William laid by the fact, with others similar in kind, but only as one of many from which his larger deductions were drawn: this may be fairly allowed, and, indeed, is virtually allowed by William Hunter himself; but the claim for him is the importance of the whole discovery, notwithstanding the ambition of a brother, who owed so much to his fostering care, in raking up an unworthy quarrel in order to institute a claim which he had for twenty-five years disclaimed by absolute silence.

It was some recompense to our Hunter that in the year when this dispute was most furious, the Royal Medical Society of Paris elected him one of their foreign

Associates, and that the Society of Physicians elected him unanimously in 1781 to preside over meetings to which Fothergill had hitherto supplied the honour of a dignified presidency.

A close friendship had long existed between Hunter and the honoured Fothergill. Fothergill, also a collector of rarities, had established a museum of great value. That it might pass into safe hands he bequeathed that William Hunter should have the offer of purchase at £500 below the real estimate. On Fothergill's death, therefore, the museum passed to Hunter for £1,200, and the Hunterian Museum stood out the wonder of scientific London, and of the scientific world. New honours fall in now; in 1782, the Royal Academy of Sciences of Paris make William Hunter a member of their body.

The fame of the Hunterian collection spread far and wide. Whoever should visit London must needs see it as one of the curiosities. Every facility was given, too, for everybody to see and learn. There is "the most magnificent treasure of Greek and Latin books that has been accumulated since the days of Mead," wrote Dr. Harwood, while a cabinet of ancient medals added to the richness of the collection. A history of certain of these coins, struck by the free Greek cities, was published by Mr. Combe in 1783, with a dedication by Dr. Hunter to the Queen. The preface of this book contains a history of the museum and the expenses to which the founder was subjected—£20,000.

The museum thus collected by William Hunter exists still, and is one of the chief objects of interest in the city near which he was born, Glasgow. By his will, the use of the museum, under the direction of Trustees, was left to his nephew, Dr. Matthew Baillie,

and in the event of his death to Mr. Cruikshank for twenty years. After that time, it was bequeathed to the University of Glasgow. The Trustees were Dr. George Fordyce, Dr. David Pitcairne, and Mr. Charles Combe, to each of whom was also bequeathed an annuity of twenty pounds for thirty years.* The sum of eight thousand pounds sterling was left as a fund for the support and augmentation of the collection. Dr. Baillie, on his part, soon allowed the transmission of the collection to the good old city; and there, in the College grounds, and in rather a noble building, the great treasures are now preserved, memorable honours to all Scottish students, so long as Scotland retains her nationality.

To describe this remarkable museum would be an impossible task in a memoir like the present. Whether we turn to the art department, to the books, to the coins, to the natural history, or to the anatomy, there is to be discovered treasure upon treasure. For my part, I hardly consider I have been to Glasgow if when there I am not able to get to this place of fascination, and, under the kind and learned guidance of Mr. Young, the Curator of the museum,—I wish William Hunter could have known Mr. Young,—pick up something new that shall become a constant recollection. In art there is a portrait of Harvey, by Van Bommel, showing the great anatomist in his old age, with pens and paper before him, and a pillar or monument of fame in the background: a portrait of the sister of Hunter, who married the Rev. James Baillie, and became the mother

* Dr. Hunter left an annuity of £100 to his sister, Mrs. Baillie, and £2,000 to each of her two daughters. The residue he left to Dr. Baillie. Brother John had not even a ring. Baillie afterwards made over to John Hunter the family estate.

of Joanna and of Matthew Baillie : and the head of St. Peter, by Rubens. Among books, we find eleven, or as some reckon thirteen, Caxtons ; the Aldine Plato, entire and almost stainless, printed on vellum ; Tyndall's New Testament, corrected by himself the year he suffered martyrdom (1536) ; three hundred volumes of Bibles left by Ewing ; and the Anatomy of Mondinus. Above all, to the medical scholar is the anatomical collection, specially interesting, not because of the number of specimens, but of the rarity of those that are to be found. There is one injected specimen which alone is worth going to see : the face of a child which has been divided into its two lateral halves, that the section of the brain may be exposed, but in which the features are so wonderfully preserved, that after a hundred and forty years the face seems still to live : in the brain the *medulla oblongata* is also more perfectly exhibited than, perhaps, in any other specimen anywhere extant. But I must really stay in description.

We arrive now at the commencement of the year 1783. By this time our constant labourer in the scientific field is failing in physical health. Notwithstanding his simple mode of life and active pursuits, he is a constant martyr to gout. Yet he keeps at his work, "as eager," says Simmons, "to acquire new credit, and to secure the advantage of what he had gained, as he could have been at the most enterprising part of his life." He engaged himself, until the very period of his last illness, in preparing various papers. One important work related to the origin, classification, and causes of urinary calculi, with engravings. He left two manuscript lectures on the history of anatomy, and one most interesting paper, "On the Uncertainty of the Signs of Murder in the case of Bastard Children."

This latter paper was read to the members of the Society of Physicians after his demise, viz., on the 14th July, 1783, and was first published in the sixth and last volume of the *Medical Observations and Inquiries*, in the year 1784. The reader is fascinated with this paper and its admirable reflections. It shows at once not only the science, but the philanthropy of its author. He pleads for the wretched women who are accused of crime with all the eloquence of a powerful writer and the caution of a philosopher. He gives sound advice to medical witnesses, which might be read still with advantage; and entering into the merits of the hydrostatic test, as applied to criminal cases, he describes its value and its fallaciousness with an acuteness and certainty which have never been surpassed.

In addition to the many scientific acquirements of William Hunter, I must not omit to mention his skill in the art of embalming. Reference was made to this in the articles on embalming, where it was indicated that he took a leading part in the introduction of the method of injecting a preservative solution by the arteries. Sometimes he practised the art. In the Royal College of Surgeons, in Lincoln's Inn Fields, there is to this very hour a proof of his skill in the embalmed remains of Mrs. Martin Van Butchell, the wife of the eccentric man of that name. This embalming was the event of its day. In one way or another it lasted, as an operation and as a sight, for about three weeks. The most exalted personages "went to see," and all fashionable London was wide awake to the proceeding. Pettigrew has left a most interesting account of the event, gathered, I have heard, from some who were cotemporary with it.

Our time flies, and we must part with another of our

Great Ones. His time comes towards the end of March, 1783. He is sixty-four years old—not more, but his life has been double that of most men of the same age. On Saturday, the 15th of March, he suffers from so much pain and nausea that he must go to bed and rest. The next Thursday he is better; and this being the day fixed for the delivery of his introductory lecture on the Operations of Surgery, he will be up and doing his work. His friends remonstrate in vain. He gives the lecture, but at the end is carried away fainting. He therefore is again returned to the sick-room. During these days of illness John Hunter comes and implores to see his patron. The patron assents, and allows John to take part in the treatment, but does not enter warmly into conciliation. . On Saturday morning Mr. Combe, who is the favourite attendant, finds his patient with speech and pulse perfect, and able to rise in bed, but himself diagnosing the existence of a paralytic seizure. The diagnosis is too correct: and so, dying daily, till Sunday, March 30th, William Hunter leaves the museum, and the chariot, and the school, and the sorrowing friends, and the world, in the conscious and calm quiet of one who has lived the representative of a single principle—Duty. His death scene is a model of fortitude. He is a traveller worn out with the fatigues of the day, and would sleep, having no dread of the darkness. “If,” said he, in his last utterance, to Combe,—“if I had strength to hold a pen, I would write how easy and pleasant a thing it is to die.”

William Hunter was buried on Saturday, April 5th, 1783, in the Rector's vault of St. James's Church, Westminster, and his remains lie there, I believe, to this day.

SUMMARY.

We have learned already much of the character of this anatomist. What is left, in the way of summary, need not detain us long. His intellectual position was not, by nature, of the highest level; but he raised himself by honest arts to a place prominent among men. The faculties by which he prospered were—industry, perseverance, and ready observation. In one passage of his last written introductory lecture, he sums up himself and his powers thus fairly:—

“Every man should be held as a criminal who locks up his talent, whatever it may be. Mine, from nature, was small; but by application and perseverance it has grown to be considerable.”

He had industry and truth, two leading elements in the quality of greatness; but he had no more. He could never have discovered a new system of worlds like Copernicus; a new world over the way, like Columbus; or the circulation of the blood, like Harvey. His talent lay in collecting observed natural facts, and in keeping a most faithful record. He was anything but a superficial man; and yet a man who dwelt only on the surface of thought. The faculties wanting in his nature were courage, liberty, and construction. His skull was too small for his brain.

With the peculiarity which marks men who have immense energy, and immense mental wealth the fruit of industry, but who are deficient in liberty and expansion of idea, he was fond of controversy and of convulsive efforts at self-defence. He had no conception that history would defend him in the right with more power and more taste than he himself could put forth. Whoever might attack him, he must be up and at them, and the more he defended the more he attacked.

But setting aside these deficiencies in Hunter's character, it is impossible not to admire the man for his industry, his devotion, his zeal, and his ambition. There is no question that he was a great teacher, and knew the secret of success in the teacher's vocation. In the two lectures left behind him, and published after his death, many very interesting facts are brought out, illustrating this trait. He announces here the plan of his course, the time of lecture—two to four p.m.—the mode in which students may introduce a friend, and the mode of studying anatomy. He adds, too, excellent opinions as to the qualifications of the lecturer. One of his observations on this latter point is so very appropriate that I give it in full:—

“I have always studied,” he says, “and shall continue my endeavours to employ the time that is given up to anatomical studies, as usefully to the students as I can possibly make it; and therefore shall never aim at showing what I know, but labour to show and describe as clearly as possible what they ought to know. This plan rejects all declamation, all parade, all wrangling, all subtlety. To make a show, and to appear learned and ingenious in natural knowledge, may flatter vanity: to know facts, to separate them from suppositions, to arrange and connect them, to make them plain to ordinary capacities, and, above all, to point out the useful applications, is, in my opinion, much more laudable, and shall be the object of my ambition.”*

* In the Library of the Royal Medico-Chirurgical Society there are several volumes of MS. lectures of Hunter. These are of great interest, as indicating the method of his teaching, although they are not notes by the lecturer himself, but by students who attended the courses. One volume, written by a careful hand throughout, bears on the cover the following:—“Anatomical, Physiological, and Chirurgical Lectures, by

We must further acknowledge his devotion to science, and his self-sacrifice. Those of his contemporaries who did not like the *one* glassful of post-prandial wine thought him penurious. But he was no more guilty of parsimony than Morgagni, whom, indeed, he closely resembled. Not at all. Each penny misspent was to him as so much taken from the future, and from the world in the future. He lived, in fact, not for himself, not for his friends, but for his race all the world over—for his race then and thereafter. We must admire his industry and perseverance. He who could work for thirty long years at one point, never leaving the subject so long as doubts remained and fresh evidence was obtainable, must be a man of science. With the exception of Kepler, there is hardly in history a man to be found whose perseverance was more steady, or whose industry was more severe.

Lastly, we must cherish the recollection of William Hunter for an all-important reason—the correctness of his observation. Reading through his various works, we find that, whatever their shortcomings, they are pre-eminent in one particular. In so far as they go they are as truthful now as they were at the time they were written. He is an author without one error

Dr. Hunter, 1759." Three other small books in MS. are entitled, "A course of Anatomical Lectures by Doctor Hunter, January 20th, 1778." A third volume of MS., very carefully written out, gives, again, the "Anatomical Lectures," without date, but with writer's name, John Ashley; and a fourth volume in MS., including the lectures on the "Gravid Uterus," is by Dr. Skeete. The care with which these MSS. have been copied indicates the value attached to them by the writers. In the Library of the Medico-Chirurgical Society there will also be found, bound up with the last two introductory lectures of Hunter, some papers relating to his intended plan for establishing a museum in London for the improvement of Anatomy, Surgery, and Physic.

of an important kind. Need more be said? Genius, haply, were wisely dormant in William Hunter.

On putting side by side the historical figures of William and John Hunter, we are struck with a view of similarities. Differences there are; but these are in degree rather than fact. William, truly, is seen as a scholar, and a man of refined professional feeling. John cracks scholastic schemes, and has a sufficient want of professional refinement to encourage Jenner to make his fortune by a secret remedy. But, in science, John follows William like a shadow. William is great in anatomy; John takes up the scalpel in imitation. William inquires into causes of animal functions, deducing from what he sees; John takes up the same points, but plunges into the unknown, and adds speculation to fact, differing so far, and no farther. William has a longing to collect strange specimens and found a great museum; John is after William again, and having the good fortune to live ten years longer, does ten years' more work. William has the power of inducing many helping hands to work for him. John sees the force of the policy, and presses everybody he can into his service. William has a taste for natural history, and opens the wicket of Paleontology. John, seeing the wicket open, walks into the ground beyond, and, finding it fruitful, digs into it to immense advantage. William likes painting and artist work in general; John is seized with the same disposition. William learns how to work twelve hours a day; John pushes on for thirteen. Finally, to change the analogies, both have pride, and the two are as one in this matter of self-satisfaction, that although there are men in the world exceedingly clever, they two are *the* men.

On the Continent the name of William Hunter

stands probably in estimation before that of John. In this country, if a Hunter is named, everybody thinks that John is meant. Dr. Priestley, in his able lectures on the Gravid Uterus, advanced the idea that on looking into the labours of William Hunter one is tempted to think that, for profundity of observation and true sagacity, he was in no respect the inferior. There must, nevertheless, be a cause for the popularity of John in this country, and a cause there is; but the cause lies not in correct public estimation of the scientific works of the two brothers. To be explicit, the College of Surgeons, having the good fortune to possess John Hunter, has found him more useful in death than in life. True, it had William Hunter too; but William, from becoming a physic-man, and from sending to Glasgow his museum, was not to the College *the* Hunter. The College, consequently, for the most obvious reasons, true to itself and John Hunter, but especially to the College, has preached up its man to such a pitch that the other man is lost in the exaltation. Every temple has its Deity, and sacrilege is sacrilege. But if by these presents I can induce my readers to peruse carefully the life and works of the two Hunters, and to draw their conclusions on the grounds of scientific merits alone, the statement underneath will receive, I believe, universal sanction.

THE BROTHERS HUNTER WERE TWINS IN SCIENCE, AND WILLIAM WAS THE FIRSTBORN.

SOME EXPERIMENTS WITH HYDROGEN ON VITAL ACTION.

AN ABSTRACT OF ORIGINAL RESEARCH.

IN previous numbers of the ASCLEPIAD I have recorded some of my early experimental researches with oxygen. In the present communication I proceed to put on record certain other researches with hydrogen. They are amongst the most singular, and, I hope I may say without presumption, the most original and important, of my past physiological labours.

This work with hydrogen commenced in the year 1852, and closed in the year 1872 for a report prepared for the British Association for the Advancement of Science, held at Brighton, a report by some misadventure never, I believe, published. The present abstract may, therefore, be accepted as composed of entirely new matter.

It may be well to commence by saying that the observations first made on the action of hydrogen upon animal bodies had for their object the discovery of a means of obtaining a substance for inhalation which should be hypnotic without being a profound narcotic. Some of the earlier experimentalists with gases and factitious atmospheres had assigned to hydrogen this property.

Beddoes had specially assigned to hydrogen this virtue, and had caused a person in consumption to sleep throughout the night, without an opiate, after inhaling hydrogen mixed with air. He observed also that the attendant on this person, who had breathed the same gas, was rendered sleepy by it, and slept in it with unusual soundness; and he suggested thereupon that hydrogen gas should be diffused through the air of the bedrooms of the sick, a proposition obviously very dangerous, considering the inflammable nature of the gas, even if it served the purpose with which he accredited it. Later on Beddoes employed, with the same intention, a mixture of hydrogen and carbonic acid, under the title of *hydro-carbonic air*, the soporific virtue of which he thought ought to be extended beyond the class of cases of the consumptive type.

Before commencing my own researches, I consulted the late Dr. Snow, whose knowledge was far above that of any one of his day in respect to the action of gases and vapours on living action. He was not sanguine as to the results, but strongly urged me to carry out the project as I had laid it before him, recommending me, at the same time, not to let the particular object in view lead me to overlook other observations which might turn up in the course of the enquiry. This advice I took care to follow.

HYDROGEN AS A HYPNOTIC.

The first research, therefore, had relation to the value of hydrogen gas as a hypnotic. The gas was made by the action of pure sulphuric acid, properly diluted with water, on chemically pure zinc. It was collected in

large reservoirs, and when required for use was displaced by water.

In the first instances small warm-blooded animals, mice, were introduced into the pure gas. The action was very rapid, but it was not the action of a narcotic in the proper sense of the word. The animals fell unconscious, but it was the unconsciousness of asphyxia, not of narcotism. The asphyxia was also rapidly fatal, and recovery under immediate artificial respiration was usually impossible. On birds the inhalation of the gas was quickly fatal. In one instance a pigeon inhaling the gas died within a minute and a quarter, the final act being instantaneous and without a struggle. In another instance a pigeon lived in the gas for three minutes, and then suddenly became insensible. On being removed, this bird had not ceased to breathe, and after a few seconds recommenced to breathe naturally, making an instant and perfect recovery.

A note appended to these two experiments deserves record here. It is that some animals die from asphyxia much quicker than others, even of the same species, and those which die most quickly die also most determinately, so that artificial respiration is of little service in their case. It is between thirty and forty years since that note was taken, and all I have ever seen from then till now only serves to establish its correctness. The fact holds true in regard to disease and accident in the human subject as well as in the lower animal, and in man is specially true in death by anæsthesia.

On cold-blooded animals the action of hydrogen was slower, but decidedly fatal. To frogs it acted simply as a negative gas, producing a painless asphyxia without anything like sleep or narcotism. But this was observed as special to the effect of the gas on cold-blooded

animals,—that when they were under the influence of an anæsthetic they might be placed in the gas, and would then continue to live for a considerable period of time. A frog put into a deep sleep by ether vapour was placed in the hydrogen jar. It was in the gas for thirty minutes, seeming not to breathe at all or to move. Yet, taken out and exposed to warm air, it soon began to recover, and rallied from the narcotic effects of the ether in the same way as if it had been immediately removed from the ether into the air.

Another frog, completely anæsthetized by cold, was placed in like manner in pure hydrogen, and was allowed to remain in the gas full thirty minutes, apparently in an unconscious state. On removal into a warm air this animal also began to recover, and made a rapid and healthy return to consciousness and activity.

On insects—flies and wasps—the hydrogen gas exerted a purely negative influence. They fell at once unconscious and motionless, appearing to be dead; but they could be left in the gas for periods of twelve hours, and when taken out would begin to recover slowly in a warm air, would then come round all at once, and fly away just as if nothing had happened to them.

In order to ascertain what the effect of hydrogen gas would be on the human subject, I inhaled it myself for fifty seconds, ceasing only to inhale when I began to experience some effect. No drowsiness whatever was induced, but instead of it a sense of emptiness of the chest, fulness in the head, and a sort of metallic taste in the mouth. I never lost a moment of consciousness, but I was extremely surprised on beginning to speak to hear my voice sounding like a reed instrument of music. The words came forth with a shrill tone almost

amounting to a squeak, and this lasted for three or four minutes; until, in fact, my lungs were emptied of all the hydrogen they contained. The change of tone depended of course on the low specific weight of the gas, and not upon any nervous action on the vocal cords.

From the study of these researches I could draw no other conclusion than that hydrogen gas, pure and simple, possesses no hypnotic properties. The next question was, whether it would answer the hypnotic purpose if diluted with air.

For this enquiry the hydrogen was mixed, in equal parts, with common air, and the same line of enquiry was pursued as in the preceding experiments. A rabbit subjected to the mixed gases breathed them for three minutes, seeming to be in no way injured, and then suddenly died without a struggle, the death being most determinate through all the structures. The only difference, in short, that could be detected between the action of pure hydrogen and hydrogen mixed with air was that the period of action was a little longer before the development of symptoms. I found myself able to breathe the mixed atmosphere nearly two minutes without any bad effect; then the same kind of symptoms came on as in the previous case, and, as before, were not followed by any inclination for sleep.

The same line of experiment was continued with other admixtures of hydrogen and common air, namely, one of hydrogen and two of air; one of hydrogen and three of air; one and four; and one and five. But nothing resulted that in any manner testified to the idea that hydrogen gas is of value as an anæsthetic or hypnotic. The acute effects we have seen were rendered slower by dilution, and that was all.

FATAL EFFECTS OF HYDROGEN GAS.

It has been said that hydrogen when it proves fatal from its administration destroys by asphyxia. This is so, but the kind of asphyxia is quite different from that which occurs from inhaling carbonic acid, or the asphyxia that is induced by strangulation, drowning, or other mode of deprivation of air. Perhaps, therefore, it would be best to substitute the term apnoea as descriptive of its effect.

The following is a concise summary of the changes induced in warm-blooded animals by the gas in fatal cases.

The lungs are left full of blood and the pulmonary veins are congested, but the pulmonary structure is red in colour, and the redness rather increases after exposure to the air. The heart contains blood in both auricles and both ventricles, and that blood, arterial as well as venous, is of the same colour, a shade darker than ordinary arterial blood; on exposure to the air it becomes redder in colour and gives off gas very freely, so that minute bubbles form on its surface, which bubbles can sometimes be made to fire by a taper, showing that they are formed by hydrogen which has been absorbed and which is mechanically held in the blood.

The blood remains fluid at 60° Fahr. for an hour after death, but then begins to coagulate, and finally forms a firm coagulum.

For a short time after the body has been opened and the heart exposed to the air there is some voluntary motion of the organ, faintly in the ventricles, more distinctly in the auricles. The motion is never very prolonged, and when it has ceased is quickly dead

altogether. Three minutes is the longest time that such movement continues.

The muscles of the voluntary type respond to galvanism an hour after death, at a mean temperature of 60° Fahr., if they be not paralyzed by too free an application of the current. But the involuntary muscles, including the heart, lose all response at once to the galvanic stimulus.

Cadaveric rigidity is delayed somewhat longer than the coagulation of the blood: in the rabbit it began an hour and a quarter after death, and was completed in two hours.

The nervous structures present no special signs of injury. The cerebro-spinal fluid was perhaps rather increased above the natural quantity, yet not sufficiently to call for any special comment.

Taking everything into consideration, it would be just to say that death under hydrogen is due, primarily, to the deprivation of oxygen; and, secondarily, to the accumulation of the gas in the blood and arrest of the circulation from that cause.

The suddenness of the final catastrophe is well accounted for as dependent on the gaseous obstruction.

Note on the Evolution of Hydrogen Gas from the Blood.

This was the first time, and is the only time, that I have ever known gas to be spontaneously evolved from the blood immediately after death. The lightness of hydrogen and its insolubility account for its escape readily enough, but the fact may be useful to remember. If, under acute forms of disease, in which chemical decompositions are going on very rapidly in the economy, hydrogen were liberated in the blood, the results

would probably be the same as in these experiments, and would in like manner be attended by sudden dissolution.

ON THE DIFFUSION OF HYDROGEN THROUGH THE TISSUES
AFTER DEATH, IN RELATION TO THE CONTINUANCE OF
THE ANIMAL TEMPERATURE.

In the years 1878-9 I conducted another research, in order to discover if the injection of hydrogen and other gases through the arterial system of warm-blooded animals, immediately after death, would have a modifying effect on the cooling of the body.

The enquiry was carried out in the following manner:—

The animal, in all cases the rabbit, was made to sleep to death in vapour of chloroform; the death was induced by an atmosphere holding 10 per cent. of the vapour of the narcotic at 64° Fahr. It was a death by the gentlest sleep. After the animal had quite ceased to breathe and to show any signs of life, the temperature of the body was taken at different parts of the body, the temperature of the air of the room being steadily maintained at 60° Fahr. The parts in which the temperatures were taken were the mouth, the lower bowel, the brain, through an opening carried into it by the nasal cavity into which the thermometer could be passed, the peritoneal cavity, and, the structure of the liver. When the registers of the temperatures had been read off from these parts and recorded, the cavity of the chest was opened, and a tube was firmly tied in the aorta, just above the heart. To the tube, made of thin metal, a piece of caoutchouc tube was attached, and this led to the reservoir

containing the gas to be employed. The gas was then slowly injected with very slight pressure through a small meter, by which the quantity was measured. The quantity injected was twelve cubic inches, as a rule, that being the quantity which seemed to pass easily over the body without rupture of tissue.

The results of this research were very singular. *They indicated that the diffusion of hydrogen through the tissues of the body tended to sustain the animal heat, an effect which differed from that of air, of nitrogen, of oxygen, and particularly of carbonic acid.*

The difference between hydrogen and carbonic acid was so remarkable it deserves to be recorded in some detail.

Two animals, rabbits of the same size, breed, health, and age, were allowed to sleep to death in the same chloroform chamber. They died at the same minute, and were removed at the same time. Immediately upon removal the temperatures of the various parts of the body were taken, and were found to be 92° Fahr. in both instances. The chest of each was then laid open, and the tube inserted and tied in each aorta, the whole proceeding taking a little under four minutes. The temperatures were now again observed, and were found to have fallen one degree. Next the rubber tubes from the metal tubes in the aorta of each were connected with the reservoirs containing the gases, and the gases, at precisely equal pressures, were gently driven over until twelve cubic inches of the respective gases were respectively diffused through the tissues of each animal. This process was allowed to extend over a quarter of an hour. By the time of finishing the diffusion of the gases the temperature of the animal treated with the carbonic acid gas had generally declined seven degrees ;

it was a degree lower in the brain than in the other parts, and it was a degree higher in the liver ; but the mean reduction may be accepted as correct at seven degrees. In the animal treated with the hydrogen gas there was no change at all in temperature.

At the close of another quarter of an hour the reduction of temperature in the animal charged with carbonic acid had fallen eight degrees more, whilst that of the animal charged with hydrogen remained still unchanged. Half-an-hour later still—that is to say, one hour after the death of the two animals—whilst the temperature of the one that had received the carbonic acid had continued to decline until it had fallen to that of the surrounding air, 60° Fahr., the other which had received the hydrogen had fallen one degree only. From this point, however, it continued to lose heat rapidly, as if some source of heat continuing after death had ceased, and an hour later the temperature of the two bodies was in every part the same.

The inference I drew from these observations was that when hydrogen gas is diffused through the tissues of an animal recently dead there is set up an eremacausis from union of that gas with remaining oxygen in the body, under which there is a generation of heat through the tissues and a sustainment of the animal warmth so long as the hydrogen or the oxygen continues to hold out.

DIRECT COMBINATION IN THE TISSUES.

In another and still more striking experiment, bearing on the last point named, I succeeded once in obtaining direct combination of hydrogen with oxygen in the tissues of an animal recently dead, by simply directing a jet of hydrogen upon the muscular

tissue in the same manner as we make the gas burst into flame, by directing it in jet on spongy platinum, or on the black oxide of platinum. A pigeon had died, almost instantaneously, in an atmosphere of hydrogen. Directly after it was dead an incision was made down into the body of the pectoral muscle. A jet of hydrogen was now directed into the angle of the freshly divided muscular substance. The gas was directed from a fine point of a blowpipe, and as it struck the muscular surface it broke into flame precisely as it does when it plays upon the platinum. This was repeated many times, not only in the one place, but in other places where a section was made into muscular structure. It also occurred at the margin of a divided muscle, where the edge of the divided part joined the cellular tissue.

SUMMARY.

In summing up the results of these researches I am led, subject to revision on further enquiry, to the following conclusions :—

1. Hydrogen gas is not anæsthetic, neither is it hypnotic, when it is inhaled by the lungs of warm-blooded animals.

2. On being inhaled by warm bloods it is absorbed by the blood at the natural temperature, but it is held only in mechanical suspension, from which it is easily dislodged on exposure to the air, rising in minute bubbles or particles from the blood and detonating under flame.

3. Inhaled so as to be taken up by the blood, it proves rapidly fatal to warm bloods, probably by the gaseous obstruction which it throws in the way of the blood in its course through the capillaries, as well as by the

deprivation of oxygen which attends the administration.

4. After death by hydrogen the involuntary muscles are first deprived of contractility, their death being exceedingly precipitate.

5. The presence of the gas in the blood retards, but does not prevent, the process of coagulation.

6. The presence of the gas in the muscular tissues retards, but does not prevent, the process of rigor mortis.

7. In cold-blooded animals the gas suspends life for a long time before it actually destroys it.

8. On insects the gas has the effect of suspending animation without destroying it, except after very prolonged exposure.

9. Diffused through the bodies of warm-blooded animals the gas, immediately after a very rapid death, and while the tissues are still charged with oxygen, has the property of maintaining the temperature of the tissues by keeping alive a slow combustion or *eremacausis*.

10. Directed in jet over the muscular tissues of a warm-blooded animal that has died suddenly, the gas may combine directly with remaining oxygen in the tissues, and produce direct combination attended with combustion.



COTEMPORARY PRACTICE AND LITERATURE.

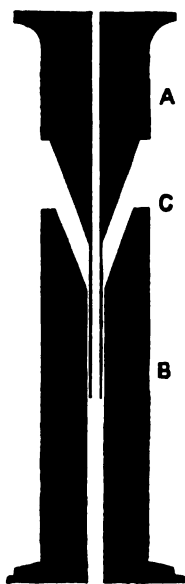
"Every physician will and ought to make observations from his own experience ; but he will be able to make a better judgment and juster observations by comparing what he reads and what he sees together."—FRIEND.

THE INTRODUCTION OF THE STETHOSCOPE INTO ENGLISH PRACTICE.

IN the notice of the illustrious Laennec given in the last ASCLEPIAD, the credit of first introducing the stethoscope into English practice was assigned to the late Dr. Granville. In this matter I believe I am in error, and that the honour really belongs to another eminent practitioner, namely, the late Dr. Charles Thomas Haden, the father of the distinguished man we all know so well, Mr. F. Seymour Haden. The form of the first instrument, sketched for me by Mr. Seymour Haden,—who has in his possession an original stethoscope from the clinique of the master himself,—is indicated in the diagram appended. It is very much like the stethoscope that belonged to Sir John Forbes, and is, in fact, made on the same mould.

At the time I wrote the article on Laennec I was not aware that the father of Seymour Haden was a man of such sterling parts as he must have been. He died so

early—at the age of thirty-eight—that his genius found no time for its development; but in what he did perform he showed, I gather, the promise of true greatness. By the kindness of his son, whom it is my felicity to call my friend as well as professional *confrère*, I am enabled to give the following brief notes of Dr. Haden, and of his qualities as a scientific physician and scholar.



A wooden cylinder, A B, about $7\frac{1}{4}$ inches long by 2 in diameter, perforated from end to end, and in two pieces, joined by a screw in the upper third at C. The upper end fits into the lower by a cone ending in a copper tube, which copper tube brings the two pieces firmly together. The wood dark-coloured, like chesnut.

“His name was Charles Thomas Haden, and he was born at Derby, December 2nd, 1786. He was, therefore, five years Laennec’s junior. He was educated at Rugby, and in 1810 was elected one of the surgeons to the Derby Infirmary. He came to London in 1814. While at Derby he was one of five remarkable men who were in the habit of meeting with others at a house called The Priory, where they formed a sort of Physical Society, and initiated many projects for the application

of science to the study of practical objects, many of which were afterwards carried out.*

“These men were Dr. Forester, F.R.S., who with my father was chiefly concerned in the projection of the arrangements which have made the Derby Infirmary a model hospital; Sylvester, the engineer, who with James Oakes founded the now considerable Alfreton Iron Works; Whitehouse, the horologist; and Darwin, the naturalist, father of Charles. Of this Society, I have always understood, my father was a brilliant member—from the great range of his reading, from his faculty of initiation (a faculty becoming rarer every day), and from his many accomplishments; of which later, when he came to London, Jane Austin makes frequent and enthusiastic mention.† Among these was a knowledge of music, in which, it has been stated, his skill was that rather of a professor than of an amateur. But his chief characteristic was, undoubtedly, his zeal for improving the medical profession. In this, though in large and lucrative practice, his efforts never flagged. He took an active part in the Medical Chirurgical Society, of which he was a Fellow. He edited the *Medical Intelligencer*, in which, I think, occurs the first mention of the stethoscope. He wrote a book on the *Colchicum autumnale*, in which the properties of that remedy as an antiphlogistic were first made

* At a later period the members of this Society were: Charles Sylvester, a philosophic engineer; Dr. Erasmus Darwin, naturalist; Francis Darwin, his son; Joseph Strutt, William Strutt, and Henry Strutt, of Belper; Dr. Forester, F.R.S.; Charles Thomas Haden, M.D.; James Oakes, one of the original promoters with Mr. Dicey of the Midland Railroad; George Lowe, engineer; John Whitehouse, known as the Clockmaker; John Mushat, metallurgist.

† *Letters of Jane Austin*, by Lord Brabourne.

known to the profession here. He translated *Majendie's Formulary* of the alkaloids, then considered highly dangerous, and was one of the first to employ them in practice. He had a close personal intimacy with nearly all the great French physiologists and pathologists of that day, and kept up an active correspondence with them. He was an early believer in the discoveries of Laennec, and worked with him at the lathe at which he made his first instruments for auscultation. He had a work well advanced on comparative anatomy and zoology; another on the best mode of improving the English language, and on the principles of punctuation; and he had made some way in an English edition of the works of Laennec. He also had it in view, by methodizing the work of clinical clerks in hospitals, to systematize and render available to the profession at large the collective experience obtained there. In the midst of these labours he died, at the age of thirty-eight, having only a few months before left London in the hope that rest and pure air might lead to his recovery. He died of aneurism at Malta. There is a good marble bust of him by Sir Rutherford Alcock, and an engraving by Finden."

POSTSCRIPT.

I am indebted to my friend Dr. Eccles Crowfoot of Beccles for a view of another stethoscope of what may also be called the first brand. It has, I believe, been in the possession of his family from the introduction of mediate auscultation, an event which would be easily remembered by his most honoured father, the late Mr. William Edward Crowfoot, F.R.C.S., of Beccles. This stethoscope is a cylinder of mahogany, seven inches long, seven and a half inches in circumference, slightly

cupped at each end, and perforated in its length by ten holes, the eighth of an inch in diameter. It acts as a very good "sunder."

SHAKSPERE AND THE *PIA MATER*.



LETTER from Mr. Edwin Litchfield, of Woodford, addressed to the *Lancet* of October 13th, 1888, anent the knowledge possessed by Shakspeare on the circulation of the blood, has led, through the columns of the *Lancet*, to the question, "How came Shakspeare to refer to the *pia mater* in the play of *Twelfth Night*, where he makes the clown say to his mistress, "Thou hast spoken for us, Madonna, as if thy eldest son should be a fool: whose skull Jove cram with brains, for here comes one of thy kin, has a most weak *pia mater*"?"

To this curious question I have made answer in the following paper, which, as it introduces a new bit of Shaksperian reading and history, may be enrolled also in the ASCLEPIAD.

The mode in which William Shakspeare obtained his knowledge about the *pia mater* is, I think, fairly explainable from a curious literary discovery which I was so fortunate as to drop upon, in my readings, a few months ago. I came across a large volume of anatomy published in the year 1615 by Helkiah Crooke. It may be said, without hesitation, that this compendious volume was the first great work in anatomy ever published in the English tongue. It fills 1111 pages of imperial quarto size, closely printed, and it is illustrated throughout by drawings on wood of anatomical subjects. Such a book would cost the most industrious writer

even in these days several years to compile and bring out, and, I should think, did cost at least fifteen to twenty years of labour. It contains not only anatomy pure and simple, but various passages of a physiological and psychological nature, which had descended from Aristotle and Galen, with references also to the Pythagorean controversies and other subjects of metaphysical cast. The book is one we may speak well of, although it is really nothing more than an industrious compilation from Gasper Bauhinus and Andreas Laurentius ; and, in so far as the plates are concerned, from Vesalius out and out, being, in point of fact, a kind of new edition of the anatomical compendium of Geminus which that systematic plagiarist from Vesalius printed, published, and dedicated to Queen Elizabeth in the year 1559.

In the volume of Crooke the membranes of the brain are well defined and described, the *pia mater* takes a very distinct place, and the brain and cerebro-spinal system are figured with a clearness which would excite no small degree of wonder in one who for the first time studied them even in this day.

What connexion has the book of anatomy by Helkiah Crooke with the plays of Shakspeare ?

This remarkable connexion : that the man who printed the works of Crooke was W. Jaggard, of the Barbican in London, the same man who was a printer for Shakspeare. Within easy walking distance from the Globe Theatre, the scene of the great William's managerial glory, was the printing-office of Jaggard, where the plates and letterpress of Crooke would for long seasons be the most remarkable press-works of the time. To that office the indefatigable playwright would often be drawn by his own business, and there

ne would hardly fail to see unfolded before him the anatomy of man from a sure source, and just in the form that would most readily appeal to his ever-absorbing mind.

In this school of anatomy ready prepared for his hand, our immortal dramatist gathered, as I believe, the fact of the existence of the *pia mater*, saw the drawing of it, and learned the function of it as the feeding mother of the brain. I might go a long way farther in exposition of the source of Shakspeare's anatomical knowledge generally, for the closer this book of anatomy and the book of plays are read together the more clearly is it detected where and how the dramatist became the student of anatomy. But at this moment I am content to stop with the proposition placed before the reader, that the *pia mater* argument of Shakspeare was simply derived from the work and plates of his industrious cotemporary, Helkiah Crooke, "doctor of physic, physitian to his Majesty and his Highness and professor in anatomy and chirurgery.

"THE ART OF DISPENSING."



VERY useful little volume of 280 pages, bearing the above title, has been published during the past quarter from the offices of the *Chemist and Druggist*. The work is intended for the instruction of that very useful body of gentlemen who are engaged in the professional task of making up the nostrums which we physicians and surgeons prescribe. There is nothing which relates to the dispenser's work that is not here explained in the clearest terms, nor is there any chapter which a medical

practitioner of any learning may not peruse with some benefit. Two chapters every prescriber ought to read, because they refer as much to himself as to the dispenser. One of these chapters is called "Prescribers and Dispensers," the other "Illegible Prescriptions." The first has some excellent comments on what is called "Ambiguous Nomenclature," in which are described the difficulties the dispenser is under when the prescriber orders some preparation out of the official names. A consultation is then necessary, or recourse to special experience possessed by the dispenser, or obtainable from others. Thus the term "Æther chlor." is a fruitful source of doubt. It is very general to dispense the official spirit of chloroform when this is ordered, but the difficulty is that the old "chloric ether" is a distilled preparation, and is soluble in water. The foolish term "Hyd. chlor." is also a cause of confusion. It may be read as subchloride of mercury, as corrosive sublimate, or even as chloral hydrate.

The authors of this work state that "it would be the saving of a great deal of anxiety to pharmacists if prescribers would take the trouble to initial unusual doses, for many instances occur in which it is impossible to know whether the dose is safe or not. For example, the official dose of potassium iodide is two to ten grains, yet twenty grains is a frequent dose, and even one or two drachms twice or three times a day, while some patients experience very unpleasant effects from a single dose of two grains.

The authors grow seriously eloquent on the subject of illegible prescriptions, and well they may. If ever they had from me any prescriptions like the specimens which they republish in *fac-simile*, I, for my part,

forgive them all ebullition of anger, however severe. Sometimes these illegible scrawls are the result of sheer carelessness, sometimes of an inability, which runs in families, to write a clear hand. Whatever it is, it is a mistake that ought to be reformed along the whole line of prescribers. There may often be a doubt whether a prescription is so sacred a document as it would at one time have been thought, but there cannot be a shadow of a doubt that if a prescription is worthy of being written at all, it deserves, at least, to be written plainly; and it shows a contempt for its value, dated from the writer of it himself, when it is so written that it cannot be understood. The prescriber who errs from pure carelessness should, therefore, mend his ways, if only to show faith in his own art; while the man who, from some defect, is unable to write clearly, try he ever so deliberately, ought to supplement the defect by artificial means: he should learn the use of the type-writer.

A few pages are usefully devoted to a description of the latest non-official remedies, their composition and assumed values, with an account of the best methods of preparing them. "Homœopathic Dispensing," which is pronounced to be "one of the simplest matters in the world"—as solemn a truth as ever was told in so few words—is dismissed in four pages.

This exceedingly brief review of "The Art of Dispensing" conveys nothing more than a taste of one of the most useful little treatises that I ever put in its right place on my library shelves, or ever read, marked, learned, and inwardly digested, with real interest and advantage; for which reasons I commend it heartily to those who have not yet been so favourably circumstanced.

OPERÆ PRETIUM EST.

THREE GREAT ADDRESSES.

(GAIRDNER, MCKENDRICK, LATHAM.)

THREE most important addresses lie at hand for current notice. The first is the address of Professor Gairdner, on the *Physician as a Naturalist*, delivered by him as President of the last great meeting of the British Medical Association at Glasgow. The second is the address of Professor McKendrick, on *The Gases of the Blood*, delivered to the same assembly. The third is the Harveian oration by Professor Latham, delivered before the Royal College of Physicians.

The three addresses are of the highest order, and ought to be read by every medical man the wide world over. The strain of Professor Gairdner's essay is that the physician ought, as his name implies, to be a "naturalist," a student of nature, one who is conversant with the philosophy as well as the physiology of life,—Aristotle, on a greater or lesser scale, with a medical degree, and with the technical skill of treating the sick at his finger ends. The physician would then become the leader as well as the curer of mankind, and would, of necessity, hold an entirely different position, in regard to influence, from that which he holds at the present time. The address bristles with argument, and has, without wonder, given rise to sharp controversy. For all this, it is well prepared, in so far as science and scientific reasoning are concerned. As an artistic production it is less perfect. It is a picture on one canvas divided into many parts. It is wanting in foreground, and when the mind begins to rest on it, instead of receiving one noble view which it can follow into

space, it is greeted with a number of delightful scenes, each of which has its own fascination and freshness, but which distracts from the whole, instead of helping to bring the whole together. It is like Gray's *Elegy*, famous in passages and grand in intention; but, as a work of art it is chaotic as if it had been composed at irregular intervals of inspiration.

Professor McKendrick's address is devoted to the subject of *The Gases of the Blood*. On reading it, with the greatest instruction and profit, I felt at the close how easy it would be to stir up a little personal grievance in respect to it; for my excellent *confrère*, whilst collecting every fact, good, bad, and indifferent, from foreign sources, has made not the slightest reference to my researches on the existence of ammonia in the blood; nor, though he treats on the topic, to my research, read at the Liverpool meeting of the British Association, on the absorption of carbonic acid by the red blood corpuscles, and the necessity of such absorption in order to secure complete oxidation of the blood in respiration. These omissions I am sure were accidental, and I meet them by recommending every student of medicine, in or out of practice, to read diligently McKendrick's masterly essay. None except those who have made an attempt to carry out a similar task can form a conception of the labour demanded, the patience, the discrimination, the necessary care that belongs to such a production. Unquestionably it is, in a scientific point of view, the *chef-d'œuvre* of the meeting, not only of the British Medical Congress at which it was read, but of all the congresses of the present year. The charm of the address does not lie in any particular claim to originality, nor in special

quality of style or method ; but in the fact that by some able and happy combination of physiology with practice, it gives the observant practitioner a new insight into disease which is both comprehensive and simple. He must from the study of this essay become a better practitioner than when he sat down to his task ; and yet he will not have read of any symptom, case, or phenomenon of disease. This is the highest art of practical composition, and the profession generally must congratulate the brilliant author for setting up a standard of excellence which in these degenerate days of impudent, vainglorious, selfish, and idiotic specialism, is a light unto the feet and a lamp unto the paths of medicine, in danger of ignominious discredit and self-immolation for so much trash as may be grasped in guineas' worth of shame and sorrow.

Of Dr. Latham's Harveian oration it would be difficult to speak in too high terms, except in one particular. It is the play of *Hamlet* without the Prince. In other words, it has less to do with Harvey than it has with Adam, inasmuch as it is exclusively devoted to the action of the poisons which produce disease and death, the first of which father Adam is said to have tasted to the death of all his race, while the labours of Harvey receive, practically, no elucidation whatever. Forgetting so much, however, and accepting the effort on its own nature and its own merits, it is a remarkable production, valuable as a landmark of medical history at a time when the greatest confusion and temporary obscurity prevail in relation to the origin of the most fatal of acute human maladies, including, first and foremost, pulmonary consumption. Dr. Latham, dissatisfied with the mushroom hypothesis of the origin of phthisis

pulmonalis, and admitting the hereditary character of the affection, makes an elaborate attempt to trace out a physical origin of heredity independently of the redoubtable germs and the direct fertilization of mankind with their maleficent presences. It is a laboured argument of the chemico-physiological kind, ingenious, hard to follow, not sufficiently chemical to be positive, not sufficiently clinical to be practical. At the same time, the teaching conveyed has this distinctive merit and satisfaction, that it runs parallel with and straight to the same spot as that to which we, as sanitarians, have been coursing on our own account for the last thirty years. It says, in its academical style:—Keep a pure mind in a pure body, and even consumption of the lungs will be a disease of the past in a near future. It admits, also, that by this same simple rule consumption has been marvellously reduced, which is the one thing needful.

TO CORRESPONDENTS.

Books, Reports, and Pamphlets intended for notice in THE ABCLEPIAD should be addressed to the Author at his residence, 25, Manchester Square, London, W.

Names of Subscribers and other Matters of Business should be forwarded to Messrs. Longmans, Paternoster Row, London, E.C.

Advertisements, and all Communications respecting them, should be forwarded to Mr. A. P. Watt, 2, Paternoster Square, London, E.C.

The Author will be greatly obliged if senders of Newspapers and Magazines would kindly mark the passages to which they wish to direct his attention.

November
15th,



1888.

INDEX.

A.

	PAGE
Alcohol at the Bedside. A Clinical Study	101
"Annual of Universal Medicine" (A. Davis)	291
Application of Cold over the Region of the Heart	138
"Art of Dispensing"	388
Art of Embalming. The Ancient Method	23
" " Method by Injection	121
" " Latest Method	212
" " Concluding Article	316
Atropa Mandragora	174

B.

Benzoated Chloroform	239
--------------------------------	-----

C.

Construction of Hospitals for Infectious Sick	184
Cotemporary Practice and Literature	91, 184, 288, 382
Cure and Prevention of Languor	233

D.

Death by Electricity	187
Degrees of Muscular Irritability	46
"Dictionary of Chemistry" (Watt)	190
"Diseases of the Bible" (Sir J. Risdon Bennett, M.D., F.R.S.)	96
Dispensing, "The Art of"	388

E.

East Wind and Disease	140
Ethylate of Sodium and of Potassium in the Treatment of Nævus	229
"Euthanasia" (W. Munk, M.D., F.S.A.)	97
Experiments with Hydrogen on Vital Action	370
Expiratory Dyspnoea	145
Extra Solitude for the Sick	336

G.

Germ Crux, The	288
Grocer's Palmar Psoriasis	144

H.

Habitual Insomnia	333
Hiccup as a Symptom in Acute Disease	43
Hospitals for Infectious Sick	184
Hunter, William, M.D., F.R.S., F.S.A. (<i>with portrait</i>)	339
Hydrops Bronchialis	48

I.

"Inebriety" (N. Kerr, M.D., F.R.S.)	193
Infliction of Capital Punishment	298
Influence of the Mind on the Pulse	238
"Influence of Sex on Disease" (W. R. Williams, F.R.C.S.)	93

J.		PAGE
Jelly-fish or Medusa, Original Observations on the		269
L.		
Laennec, René Theophile Hyacinthe, M.D., and the Discovery of Mediate Auscultation by the Stethoscope (<i>with portrait</i>)		240
Languor, Cure and Prevention of		233
M.		
Mead, Richard, M.D., F.R.S. (<i>with portrait</i>)		49
"Medicine in Ancient India" (Surg.-Gen. Gordon, M.D., C.B.)		297
Methylal, use of in Delirium Tremens		134
Methylal as an Antiseptic		326
Methylene as an Anæsthetic		201
Morgagni, John Baptist, M.D., F.R.S. (<i>with portrait</i>)		147
Morphine Habit, Practical Notes on the		301
N.		
Nævus, Treatment of with Ethylate of Sodium and Potassium.		229
Nausea from Movement of the Body in Rotation		334
O.		
Operæ Pretium Est	99, 196,	391
Opuscula Practica	40, 134, 229,	326
Original Observations on Physiological Therapeutics made on the Fresh-water Jelly-fish or Medusa		269
P.		
Palmar Psoriasis		144
Physical Relief of Mental Excitement		45
Practical Notes on the Morphine Habit		301
Pulmonary or Pneumo-Paresis		1
R.		
Recurrence of Symptoms of Chronic Syphilis		142
Researches in Therapeutics	80, 174, 269,	370
S.		
Shakspeare and the Pia Mater		386
Standards of Health and Vitality		328
"Story of Creation" (Edward Clodd)		293
"Strength and Happiness" (R. A. Proctor)		91
Stethoscope, Introduction of, into English Practice		382
T.		
"Tabes Mesenterica and Phthisis Pulmonalis" (W. J. Gairdner, M.D., and Joseph Coats, M.D.)		192
Tannin Wool		47
Tapping for Ascites		236
Therapeutics, Researches in		80
Training for Future Generations		331
"Treatment of Migraine with Indian Hemp" (Richard Greene, F.R.C.P.E.)		295
Testing for Ammonia under Ammonia Treatment		40
V.		
Vertigo from Constipation		338

APPENDIX OF ACKNOWLEDGMENTS.

BOOKS RECEIVED.

- "The Story of a Great Delusion." By WILLIAM WHITE. London: E. W. Allen. 1885.
"Pathology and Treatment of Ringworm." By GEORGE THIN, M.D. London: J. and A. Churchill. 1887.
"Lectures on Diseases of the Eye." By C. BELL TAYLOR, M.D., F.R.C.S. London: G. Redway. 1888.
"A Dictionary of Lowland Scotch." By CHARLES MACKAY. Edinburgh. 1888.
"National Temperance League Annual for 1888." By ROBERT RAE. London: National Temperance Publication Depôt. 1888.
"Collected Essays in Preventive Medicine, with Glycosuria." By WILLIAM SQUIRE, M.D., F.R.C.P. London: J. and A. Churchill. 1887.
"The Demon of Dyspepsia." By A. E. BRIDGER, M.D. London: Swan Sonnenschein & Co. 1888.
"Cow-Pox and Vaccinal Syphilis." By JAMES CREIGHTON, M.D. London: Cassell & Co. 1887.
"Dissolution and Evolution." By C. PITFIELD MITCHELL. London: Longmans & Co. 1888.
"Inebriety." By NORMAN KERR, M.D., F.L.S. London: H. K. Lewis.
"Lectures to Practitioners." By W. T. GAIRDNER, M.D., LL.D., and JOSEPH COATS, M.D. London: Longmans & Co. 1888.
"Revised Statutes and Regulations respecting Public and High Schools, Ontario." Toronto: Warwick & Sons. 1887.
"Life and Labour." By SAMUEL SMILES, LL.D. London: John Murray. 1887.
"Specific Unbelief." By ANDREW SIMON LAMB. London: James Nisbet & Co. 1887.
"The Increase of Cancer in England." By J. F. CHURCHILL, M.D. London: David Stott. 1888.
"Physiological and Clinical Studies." By ALEXANDER JAMES, M.D., F.R.C.P.E. Edinburgh: Oliver & Boyd.
"Hazzell's Annual Cyclopaedia." Edited by E. D. PRICE, F.G.S. London: Hazell, Watson, & Viney. 1888.
"The Study of History in American Colleges and Universities." By HERBERT B. ADAMS, Ph.D. Washington. 1887.
"Earth Closets and Dry Scavenging." By JOHN D. GARRETT. London: W. Clowes & Son. 1888.
"Papers read at the Anglo-Jewish Historical Exhibition." London: Office of Jewish Chronicle. 1888.
"St. Chris." By E. VAN SOMMER. London: National Temperance Publication Depôt. 1887.
"The Saliva as a Test for Functional Disorders of the Liver." By SAMUEL FENWICK, M.D. London: J. and A. Churchill. 1887.
"Engravers and Engraving." By FRANCIS VACHER. London. 1887-8.
"Sherryana." By F. W. C. London. 1888.
"The Story of Creation." By EDWARD CLODD. London: Longmans & Co. 1888.
"Some Observations on Headaches in Children." By W. H. DAY, M.D. London: J. and A. Churchill. 1887.
"Scheme of Case Reporting." By W. H. ALLCHIN, M.B., F.R.C.P. London: H. K. Lewis. 1887.
"Doctors and Doctors." By GRAHAM EVERITT. London: Swan Sonnenschein & Co. 1888.
"Brave Hester; or, Cause and Consequence." London: Jarrold & Sons. 1887.
"Natural Strategy against Infection." By the Hon. R. RUSSELL. London: National Press Agency. 1888.
"Letter to the Rt. Hon. Lord Aberdare, Chairman of the Hospital for Sick Children." By CHARLES WEST, M.D. London: H. Sotheman & Co., Piccadilly. 1887.
"Eye Troubles in General Practice." By C. BELL TAYLOR, M.D., F.R.C.S. Nottingham: Stevenson, Bailey, & Co.
"Notes on Prolonged and Apparently Hopeless Blindness." By C. BELL TAYLOR. 1875.
"Outbreaks of Sore Throat caused by Slight Escapes of Coal-Gas." By Prof. W. H. CORFIELD, M.A., M.D., F.R.C.P. London: Harrison & Co. 1887.
"Behind the Tides." By C. B. RADCLIFFE, M.D. London: Macmillan & Co. 1888.

- "Vegetable Tumours." By W. ROGER WILLIAMS, F.R.C.P. London: Adlard & Son. 1887.
- "Dax; A New Winter Health Resort." By TITUS DEVILLE, M.D. Leicester: W. H. Lead.
- "Remarks on a Recent Outbreak of Typhoid or Enteric Fever at Southampton, L.T." By F. E. BECKWITH, M.D. Newhaven: O. A. Dorman.
- "Presidential Address delivered before the Philadelphia County Medical Society." By J. SOLIS-COHEN, M.D., January, 1888. Philadelphia: W. J. Dornan. 1888.
- "Description of a Modified Laryngectomy." By J. SOLIS-COHEN, M.D. New York. 1887.
- "Recent Advances in the Treatment of Pulmonary Consumption." By J. SOLIS-COHEN, A.M., M.D. Philadelphia.
- "Septic Pneumonia" and "The Safe Dose of the Salicylates." By F. H. ALDERSON, M.D. London: 1887-8.
- "Eighth Inaugural Address to the Fellows of the Medico-Legal Society of New York." By CLARK BELL, Esq. New York. 1888.
- "Address delivered before Corporation of the Washington Home, Boston, Massachusetts, on its 30th Anniversary." By T. D. CROTHERS, M.D. Hartford, Conn. 1888.
- "Inaugural Address on the Definition of Life as affected by the Protoplasmic Theory." By JOHN DRYSDALE, M.D., F.R.M.S. Read at Liverpool, October 1887.
- "Teachers' Handbook, designed to accompany Yaggy's Anatomical Study." By H. F. RASSWEILER, A.M. Chicago: Western Publishing House. 1886.
- "On Some Social Aspects of Sanitation." By J. B. RUSSELL, B.A., M.D., LL.D. Glasgow: Robert Anderson. 1887.
- "Watts's Dictionary of Chemistry." By H. FORSTER MORLEY, M.A., D.Sc., and M. M. PATTISON MUIR, M.A. London: Longmans, Green, & Co. 1888.
- "The Belief in Immortality." By A. ELLEY FINCH. London: Sunday Lecture Society. 1888.
- "Scientific Collective Investigation of Disease." By H. B. BAKER, M.D. Chicago: Office of Association. 1887.
- "Some Comments on Leprosy." By A. M. BROWN, M.D. London: Hirschfeld Bros. 1888.
- "On Dipsomania." By J. G. DAVEY, M.D. London: Odell & Ives. 1872.
- "On Life and its Lessons." By J. G. DAVEY, M.D. Bristol: James Fawn & Son. 1883.
- "Observations on Fever." By JAMES NIVEN, M.B., M.A. London: John Heywood. 1887.
- "On Retrobulbar Incision of the Sheath of the Optic Nerve in Cases of Swollen Disc." By R. BRUDENELL CARTER. London: W. Clowes & Son. 1887.
- "The Popularisation of Art Criticism." By E. B. RUSSELL. Liverpool: Henry Young & Sons. 1888.
- "Speech on the Liquor Traffic." By Hon. H. W. BLAIR, in the Senate of the United States, April 1886.
- "Treatment of Sleeplessness." By A. SYMONS ECCLES, M.B. London.
- "On the Necessity for a Modification of Certain Physiological Doctrines regarding the Interrelations of Nerve and Muscle." By THOMAS POOLE, M.D. Washington. 1887.
- "On Inebriety, and the Duty of the State with regard to Inebriates." By ISAIAH DE ZOUCHE, M.D., M.R.C.S. Dunedin: Joseph Braithwaite. 1885.
- "The Sweating Sickness." By F. H. GERVIS, M.R.C.S. London: C. W. H. Wyman, 1887.
- "Placenta Prævia." By JOHN F. LE PAGE, M.D. Manchester.
- "Diagrams illustrating a Paper on the Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air Passages." By H. B. BAKER. Lansing, Michigan. 1887.
- "Agricultural Returns of the Isle of Man from 1881 to 1884." By A. H., *Isle of Man Times*, Nov. 1884.
- "Biographical Sketches of Allan Burns, M.D. (1781 to 1813), John Burns, M.D. (1774 to 1850), and Allan Burns, M.D. (1810 to 1843)." Edinburgh: Blackie & Son.
- "De l'Action des Eaux d'Aix-les-Bains, Marlioz et Challes dans le Traitement de la Syphilis." Par LE DOCTEUR L. BLANC. Aix-les-Bains: Antoine Bolliet. 1887.
- "St. Moritz: its Climate and its Waters." By A. BIERMANN, M.D. Chur and St. Moritz: Hitz & Hail. 1887.
- "Errors of Local Administration." By EDWIN CHADWICK, C.B. London: 1888.

Magazines and Exchanges in next Number.

